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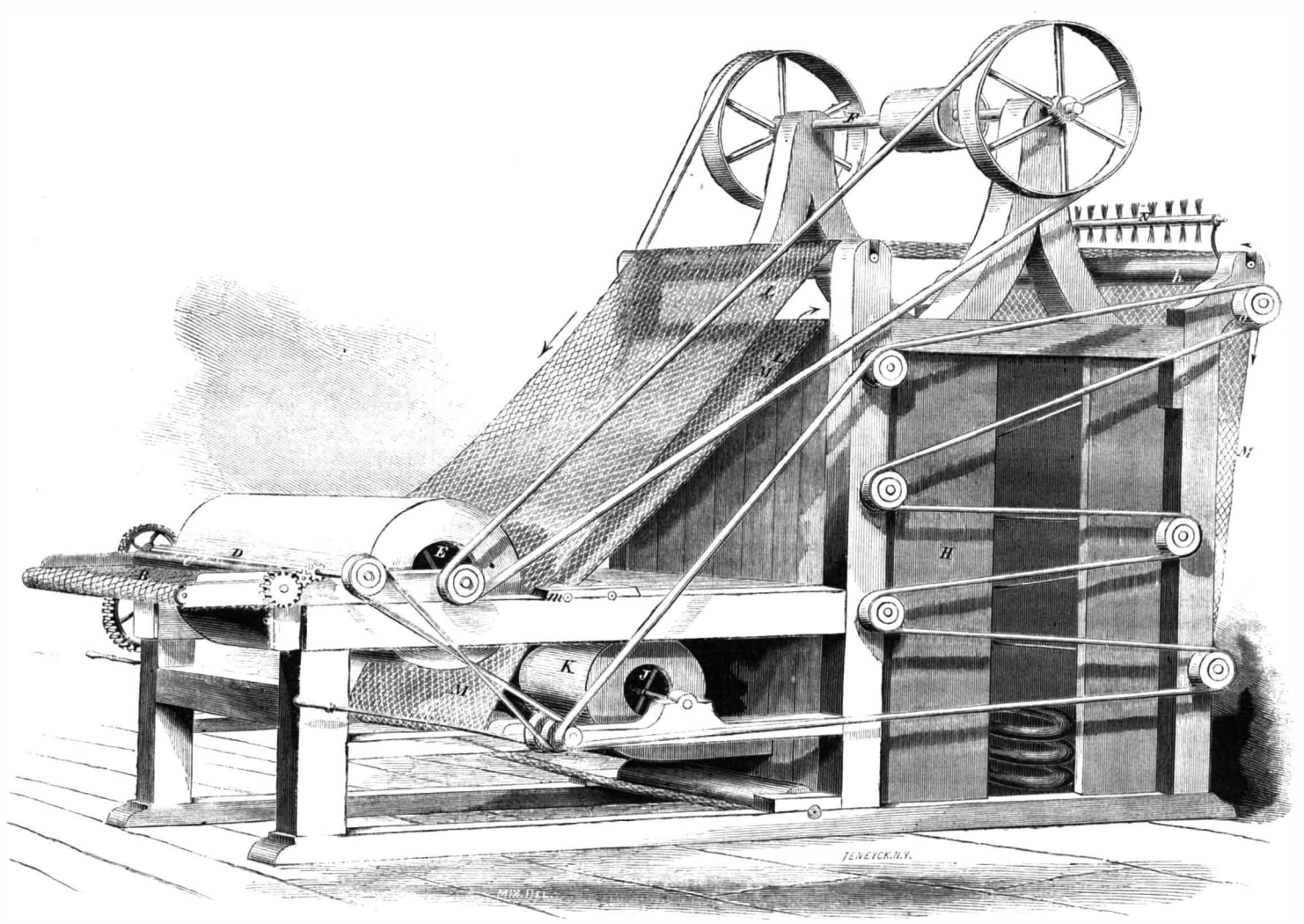
Improved Wool-drying Apparatus.

In the manufacture of wool the first process, after assorting it according to its fineness, is to cleanse it from the oily matter and dirt which it collects while on the sheep's back. To this end, it is washed very thoroughly with soap suds or with alkaline lye, after which it must, of course, be dried, or colored and then dried. The accompanying engraving illustrates an apparatus by which wet wool may be dried in a very expeditious manner and in a very small space.



JAMES'S WOOL-DRYING APPARATUS.

The wool or cotton is spread upon the horizontal endless apron, B, which carries it slowly between two india-rubber rollers, one of which only, C, is shown in the engraving. These rollers press out a considerable portion of the water from the wool. As the wool leaves the india-rubber rollers it is carried by the fluted roller, D, to the revolving picker, E, which beats it up into a light state, and throws it down upon the upper surface of the endless apron, M. This apron as well as its fellow, L, is made of wire cloth, and the wool is carried in a thin sheet between the two aprons into the drying box, H. The apron, L, comes down as indicated by the arrows, and, passing around the roller, *m*, comes upon the upper side of the stratum of wool which is carried up to the top of the drying box, as indicated by the arrow.

Coiled in the bottom of the drying box is the steam pipe, I, which supplies the heat for the operation. Directly over this pipe the box is divided by a diaphragm of metal, perforated with numerous small holes, which serves to divide the air and distribute it evenly through all parts of the box. Hot air is supplied to the box through a pipe, G, by a fan, K.

After the wool has been carried back and forth several times across the interior of the box as shown, it passes out, and the two aprons, entering between the rollers, *o* and *h*, are separated; the apron, L, passing over the the roller, *h*, and the apron, M, passing over the roller, *o*, and returning down under the box, as indicated by the arrows. The rapidly revolving fan, N, brushes off any wool which might be inclined to adhere to the apron, L.

In case any portion of the stratum of wool should not be thoroughly dried by the passage at the ordinary speed through the box, provision is made for stopping the aprons for such time as may be required to complete the drying process. Motion is communicated to the mechanism by the shaft, F.

A patent for this useful invention was granted, through the Scientific American Patent Agency, on May 28, 1861, and further information in relation to it may be obtained by addressing the inventor, Benjamin James, at Worcester, Mass.

THE new Sultan of Turkey has ordered the construction of an armor-plated vessel.

AN ENGINEER'S RESPONSIBILITY.—A railroad engineer keeps his eye fixed on the track with the steadiness of an eagle every moment that the train is in motion, and if one will pause to think of it, when dashing along at the rate of five and twenty miles an hour, it is awful to remember that he is the only person who does look ahead. The fireman takes it easy, firing up when necessary, ringing the bell, applying the brake, &c., as he is directed, but he does not trouble himself to keep a steady lookout. As to the conductor, brakemen, &c., they cannot look ahead, even if they wanted to, any more than the passengers can. It is curious to think, too, how slight a thing may hurl the train to destruction; the breaking of a flange, a rail, a nut, a screw; the sudden slipping of a valve—any of these, apparently unimportant things, will send the train whirling down a precipice or into a river.

ST. LOUIS.—The fortifications around St. Louis are progressing; palisades, block-houses and earthworks are being constructed on the west and south sides; the north side will be amply fortified by placing a few batteries on the water reservoir, which is in itself a splendid fortification, almost impregnable, from its hight and the impossibility of scaling it, and covering the entrance of the Northern Railroad and Mississippi river.

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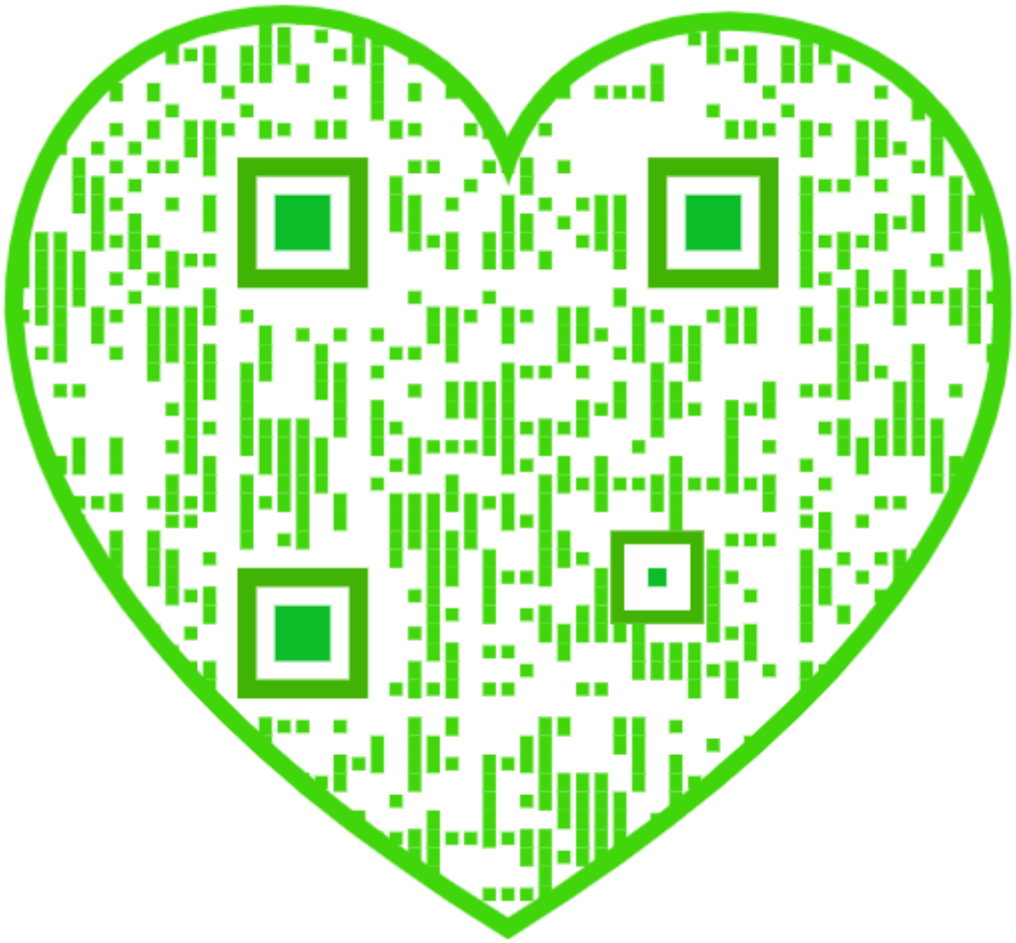

THE WAR.

ABANDONMENT OF THE FORTS AT OCRACOKE INLET.

After the capture of Fort Hatteras, as narrated in our last, a portion of the fleet proceeded to Ocracoke Inlet, where the works were found to be abandoned by the secessionists.

UNIONISM IN NORTH CAROLINA.

The people from the main land, as soon as they learned of the capture of Fort Hatteras, began to come across the sound in large numbers to take the oath of allegiance to the government, and to implore protection from the intolerable despotism of Jefferson Davis. It is very positively asserted that a majority of the voters of North Carolina are in favor of the Union, but are overborne by the amazing audacity and energy of the secessionists.

A HORRIBLE DEED IN MISSOURI.

Some miscreants connected with the secessionists of Missouri, committed a most fiendish crime on the 3d of September, which resulted in the killing and wounding of 80 or 90 men, women and children. The Hannibal and St. Joseph Railroad crosses the Little Platte river ten miles east of St. Joseph by a wooden bridge, and the assassins burned the timbers of the bridge nearly through and then extinguished the fire. The express passenger train bringing from eighty-five to one hundred passengers, including women and children, reached the river at 11 o'clock at night, and the bridge looking secure, passed on; but no sooner had the locomotive measured its length upon the bridge than some forty or fifty yards of the structure gave way, precipitating the entire train into the abyss below. All the seats in the passenger coaches were torn and stove in front, carrying men women and children in a promiscuous heap down the declivity and burying them beneath the crushed timber, or throwing them out of the cars through the broken sides. Some were mangled by the machinery tearing through the timbers; several were caught between planks pressing together like a vice; others were struck by parts of the roof as it came down with mighty force; still others were cut with pieces of glass, while wounds and blood and agony prevailed all over the scene, and shrieks of pain were mingled with cries of terror. Into this groaning mass the last two cars of the train went down, pitching the passengers into the wreck, or throwing them into the water which, at this point, is about a foot and a half in depth. Only three persons, J. W. Parker, superintendent of the United States Express, Mr. Mars, mail agent, and Mr. Hager, were able to afford assistance to the sufferers—the remainder of those who were not killed outright being so disabled as to be helpless. After doing all that was possible for those requiring immediate attention, Mr. Hager at midnight left the wreck to go to St. Joseph for medical and other assistance. He walked five miles of the way when he found a hand car, upon which he proceeded the remainder of the journey. Two hundred yards west of the bridge he discovered a heavy oak railroad tie stongly strapped across the track, and two miles further on he found the trestle work over a small stream on fire, which, however, had not as yet been so badly burned that trains could not pass over; the fire was easily extinguished.

Arriving at St. Joseph, the alarm was soon spread throughout the city, and althoug it was one o'clock at night, seventy five men, including all the physisicians in the neighborhood, volunteered their services; and at half-past three o'clock, a train fully equipped, supplied with medical chest and other necessaries, was at the scene of the disaster.

The wounded had emerged from the wreck, and were lying on the banks and upon a sand bar in the river. Seventeen dead bodies were recovered, and it is believed that this number embraced all who were killed up to that time. Two are so badly mangled that it was not expected they would survive till morning, while many others were dangerously wounded, and would have to be well taken care of to recover. Many who will escape with their lives will be maimed and crippled.

QUARTER-MASTER GEN. MEIGS is providing for the comfort of our troops during the coming winter campaign. Among other matters, he is procuring portable stoves, to be used in tents. Napoleon had over three thousand stoves sent to the army, while engaged in the siege of Sebastopol, besides a number of wooden huts.

A Scientific Secessionist Killed.

In the graduating class of the Philadelphia College of Pharmacy of 1850, was a young man named Joseph Laidley. The class was a fine one and Laidley among the most brilliant of its members. He secured a situation with the firm of Adie & Gray, of Richmond, at a large salary. He remained with them several years and last year entered into business on his own account.

Some weeks ago he advertised to prepare detonating powder, and made himself over to the Secessionists for the profits of the business. He was appointed superintendent of a cartridge factory, when an untimely fate overtook him. The manner of his death is thus told in a Richmond paper:—

Mr. Joseph Laidley, the well known chemist, came to an untimely, sudden and horrible death about 20 minutes to one o'clock yesterday, by the explosion of a quantity of detonating powder, which he and an assistant named Robert Clayton, of Manchester, were preparing for the use of the Confederate army, in a building erected especially for their use, rear of the State armory. At the hour above named an explosion was heard resembling the distant charge of a 6-pounder. On repairing to the place a scene of rare horror met the gaze. The wooden outbuilding, and the interior one in which the powder was manufactured, were found blown down, and many of the timbers wrenched, twisted and broken in a manner to show the almost inconceivable power of the powder. Mr. Laidley was found lying on his back, one of the most horrible objects of mutilated humanity which it is possible to conceive. Within a few yards of the body was found a portion of the poor man's brains, looking as if they had been torn by a superhuman agency from the skull and splashed upon the floor. The entire head, except the lower jaw, had been blown off, and nothing remained to mark the features of a man except a pair of whiskers and a portion of the neck. The right arm was torn off below the elbow, and from the bloody stump hung the fragments of nerves, veins, and sinews which were left behind. The hand was afterwards found about two hundred yards from the place of explosion, in the yard of the State armory, a portion of the face was likewise found (it is said) three hundred yards distant, near the banks of the river. The search for the remainder proved unavailing. His assistant, Mr. Clayton, was found in a reclining posture against a post, doubled up as if he had suffered a fearful contortion. He was perfectly insensible and so remained up to a late hour last night, but it was not ascertained to what extent he was internally injured. Among the rumors connected with this melancholy affair, was one to the effect that deceased had been seen going toward the laboratory smoking a cigar. Several persons declared that they saw him going thither smoking a short time before the explosion was heard. It is said that he was not in the habit of smoking. That the man possessed rare talent cannot be denied. Some of the most valuable contributions to the *Journal of Pharmacy* are from his pen. He was at one time an active member, and a Vice President of the Association.

An American Regiment of Cuirassiers.

An American residing in Paris writes as follows to the New York *Spirit of the Times*:—

The Chasseurs de Vincennes is one of the most formidable regiments of cavalry in France. In fact, its valor has made it as notorious as are our gallant Fire Zouaves, and called upon its members the title of *Les Enfants Perdus* (lost children) for they were always seen diving into the thickest of the battle and appeared entirely reckless of life, and after accomplishing miracles, very few were lost in their rencontres. This was owing to their being clad in a cuirasse and helmet of steel, Minie ball proof. Members of this regiment can do picket or skirmishing duties with impunity; for the horse is also protected in front of the head, breast, and shoulders.

The prices of these coats of mail (bullet-proof) are from fifteen to twenty-five dollars each and the helmet from four to five dollars; while the caparisons for protecting the horse are comparatively cheap. Thinking that our government might desire to raise and mount a regiment of Cuirassiers induced me to send to a commissionaire in Paris for a list of prices, which I find much more moderate than I had anticipated.

HOW A MAN FEELS WHEN HE IS SHOT.—We take the following from a letter written by one of the gallant Iowa volunteers who fought in the battle near Springfield, Mo.:—"I was standing, or rather kneeling, behind a little bush reloading my musket, just before the rebels engaged in this close work retreated. Suddenly I felt a sharp pain in the shoulder, and fell to the ground. Jumping up, one of our boys asked me if I was hurt. I replied I thought not, and drew up my musket to fire, when he said: 'Yes; you are shot right through the shoulder.' I think it was this remark, more than the wound, which caused the field, all at once, to commence whirling around me in a very strange manner. I started to leave it with a half ounce musket ball in my shoulder, and once or twice fell down with dizziness, but in a short time recovered sufficiently to be able to walk back to Springfield, nine miles, where the ball was taken out."

THE best stimulant in the world is oxygen. The way to take it is by introducing it into the blood. This can be readily done by taking large quantities of pure air into the lungs. Exercise promotes breathing; and breathing oxygenates the blood, and stimulates the brain to the highest activity.

Substitute for Lint in Military Surgery.

The *Medical and Surgical Reporter* says:—"An excellent, cheap and convenient substitute for patent lint for dressing gunshot and other wounds is a material which we propose to call 'perforated muslin.' It is prepared by simply folding several yards of muslin many times, and with a small punch and mallet perforating it with numerous holes a short distance apart. Much of the substance of the muslin is removed by the punch, and it is rendered sieve-like or reticulated in appearance. It makes an admirable, light and airy dressing for wounds, and several thicknesses may, if necessary, be used to absorb purulent discharges. It has the great advantage for military surgery of cheapness and ready preparation from materials which can always be conveniently at hand. We are indebted for the suggestion to a correspondent of the London *Lancet*, and have thoroughly tested its efficiency in the surgical wards of the Philadelphia hospital. For some purposes, we prefer it to any other material for dressing wounds, particularly in our favorite dry dressing."

THE Taunton (Mass.) Locomotive Manufacturing Company, says the New Bedford *Mercury*, is engaged in rifling breech-loading carbines for cavalry use. An order to rifle 1,000 has been nearly completed, and the same concern will, if the work already undertaken proves to have been well done, have further orders. The company are also finishing up one or two large shafts for the sloops of war now building. One weighing 4½ tuns, 24 feet 8½ inches long, and 21 inches in diameter, to be covered with a shell of brass ½ inch thick, is designed for the sloop of war now building at Portsmouth.

NUMEROUS cases of "incipient typhoid fever" are noticed among the three months' volunteers who returned in such fine health a few weeks ago, occasioned by their sudden change of habits, coupled, in many instances, with indolence and too free use of money. Sickness was to have been expected to some extent. The old folks tell us that after the war of 1812, "camp fever" proved as destructive to life as ever did the casualties of an active campaign. The best way to arrest this sickness may be to re-enlist.

GENERAL MCCLELLAN made an ascension with Mr. La Mountain in his balloon, at Washington, on Saturday, August 7, to reconnoiter the position of the enemy.

AN IMMENSE TRAIN.—A train of cars recently passed over the New York Central Railroad, bound westward, *one mile and a quarter and thirty rods in length*, and was drawn by five locomotives. The passenger traffic on this road has recently much improved, and the indications of a heavy fall trade are everywhere apparent.

WHY IS IT SO?—An exchange says:—"Fasten a nail or key to a string, and suspend it from your thumb and finger, and the nail will oscillate like a pendulum. Let some one place his open hand under the nail, and it will change to a circular motion. Then let a third person put his hand upon your shoulder, and the nail becomes in a moment stationary."

RAILWAY TYRES.—Mr. A. P. Stocker, of Walverhampton, England, proposes to combine layers of steel, iron or puddled steel with layers of ordinary wrought iron, and to roll and weld them together, so as to combine increased durability and power to resist wear and tear with sufficient toughness to resist breakage.

THE California Agricultural Society requires that a first premium work horse shall be between fifteen and sixteen hands; quick, lively ears; broad between the eyes; round barrel; short loins; well up in the shoulder; deep chested; square quarters; flat legs; short between the knee and pastern and hock and pastern; hind legs well under him; speed equal to eight miles an hour on the road, and at least three miles at the plow; with sufficient blood to insure spirit and endurance.

THE consumption of claret wine in London, under the French treaty, is not so great as was anticipated. It is not strong enough for John Bull, who condemns it as "a weak invention of the enemy."

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The Mode of Engraving Bank Notes.

[From the New York Evening Post.]

Of the thousands of persons who daily pass the Merchants' Exchange in Wall street, not one in a hundred is aware that in this bulding is located the most extensive bank-note engraving establishment in the world. The American Bank Note Company, incorporated in 1858, brought together the valuable accumulations of dies, machinery and other resources, together with the talent and experience, of all the largest engraving establishments in this country, thus giving the company a position superior to any other engraving establishment at home or abroad, and furnishing to governments, banks and the community the most trustworthy securities for the safe issue of a bank-note currency. The company is appreciated abroad as well as in the United States. Two years ago it furnished a set of plates for the National Bank of Greece ; it has done work for South American states, for Canada, for the government of Russia, and its designs, facilities and securities have been preferred to those presented by the best establishments of France and England. The company is now engaged in preparing the United States Treasury notes authorized by the act of July 17.

A general description of the different departments connected with this establishment will give an idea of the various processes required to produce a perfect bank note.

DEPARTMENT OF DESIGNS AND MODELS.

Immediately above the business offices, which are on the first floor of the Exchange, are the rooms devoted to designs and models. All of the vignettes originate in this department ; and the engraving, when finished, is brought here to the superintendent for his revision and approval. The designs are furnished by Darley, Casilear, Herrick and Edmonds (who has been a bank cashier) ; and abroad, the well-known artists Gilbert, Thomas, Birket Foster and Faed are employed by the company. In some cases the artists send original sketches, but generally embody the ideas suggested to them. Darley's designs are frequent in our bank-note circulation,and are at once recognized by those who are familiar with his style. The vignettes are combined with portraits of individuals and the letters and lathe work which make up a bank note.

In the model room, which is connected with the design department, the style or model of the plate to be engraved is made up. A new bank may want a set of plates embellished with agricultural, commercial or mechanical designs, or the three combined. From the thousands of models in the office there is an almost unlimited opportunity for selection and new combinations, or new designs may be suggested. The rest of the note is adapted to the vignettes chosen, and the usual filling in, with all the securities against alteration and counterfeit, are added to make a perfect note and present an artistic appearance.

If a selection is made from models already engraved, a plate can be prepared for the printer in a week. Four notes are always engraved on a plate, and a small bank will begin with one plate with four denominations on it, while a larger bank will have a plate for each denomination issued. The plates cost from $500 to $900 each, according to the amount of labor expended on them.

THE PICTORIAL ENGRAVING DEPARTMENT.

The drawings are sent from the design room to the pictorial engraving department. The best artists are employed in this department, and there are fifteen men, each at his own desk, who work eight hours per day, and earn from $2,000 to $4,000 per year. Some of them work exclusively upon "heads" ; other upon human figures. In some cases a vignette which comprises landscape, sky, architecture and figures will pass through as many different hands, and the separate parts of the work, finished by artists who have made that style a specialty, make the whole as perfect as possible ; indeed, a first-class vignette, unless a portrait, is hardly ever by one hand, and a portion of it is "bit in" with acids and afterwards finished with a graver. The portrait engravers become so skillful that they produce a perfect likeness from a photograph, painting or engraving, and whatever work is in hand is given to the artist who is best qualified to make a finished picture of the kind required.

THE LETTERING DEPARTMENT.

Eighteen men are employed in the lettering department ; and here, as in the pictorial engraving room, the work is subdivided, so that each engraver works in the style he has made his special study. Some engrave script letters, others Old English and German, and others still the square or Roman letters ; and the shading of the letters is done by machinery, making the fine and regular parallel lines, which no counterfeiter can imitate by hand. Both engraving rooms are favored with a fine northern light. The tools of the engraver are very simple, and cost but little ; but his capital—his hand and taste—are matters which to him have more than a money value.

All of the vignettes, and much of the larger letter work, are engraved on separate pieces of steel, from which proofs only are printed. These pieces are taken to the hardening room, where two men who are experienced in handling steel harden them by heating and plunging them into water or oil. From thence they go to

THE TRANSFERRING DEPARTMENT.

The hardened plates are placed under presses of enormous power, and are "taken up" upon decarbonized dies of a cylindrical form, which are afterwards hardened and are used to transfer the impression to the plate from which the notes are printed. Thus the work is doubly transferred before it is printed. In this department is stored the immense stock of dies—an accumulation of more than forty years—embracing almost every design ever seen on an American bank note. They are carefully guarded and protected, and so arranged that any one of them can be found in a moment. The dies are used not only in producing new plates, but in restoring the plates already printed from, and bringing them up to their original sharpness and finish.

There are fifteen men employed in transferring. The machines, which are worked by hand, are ingenious, and are subjects of constant improvment. This department, like all the others, is under the charge of a superintendent, who is a master of this branch of the bank note engraving business.

When the "model" of the plate to be engraved is brought to the lettering and transferring departments, careful measurements are taken for the respective portions to be executed. The more important of these have been described, and from the pictorial and lettering rooms the model goes to the most interesting part of the establishment—the geometrical lathe room—which is not open generally to visitors.

Here is executed that curious, complicated and beautiful ground work for the figures, and from which the tints on the face and back of a note are printed. Such is the accuracy and uniformity of the geometrical lathe work and cycloidal ruling that it is impossible to imitate them by hand. The production of these lace-like figures is the result of a mathematical problem worked out beforehand ; so many turns of certain wheels will produce a certain figure which can be multiplied by the transferring process indefinitely. The machines are very complicated and expensive, (though to one unacquainted with them they seem cheap and simple), and require great skill and experience in their management and operation. We were shown in this department a geometrical lathe, not twice as large as an ordinary sewing-machine, and less than half as noisy, which was three years in building, and cost about $10,000. These machines are never patented, as the secret of their construction is worth more than a patent, and improvements and alterations are made from time to time, while their great cost prohibits their coming into general or improper use.

In making a bank-note plate the heavier portions of the work are finished first. In transferring the vignettes and larger lettering the plate is swelled more or less at the edges, and requires to be straightened ; when this part of the process is complete, the script and lighter ornamental work is added, and the plate carefully finished and made ready for the printer.

ARMY OBSERVATIONS.—George Raphael, of New York, recommends the use of the camera obscura at Washington for making observations as to the position of the enemy. He says that by elevating the camera seventy-five feet, objects no larger than a dog can be seen at fifteen miles distance. This process, Mr. Raphael says, is much easier, cheaper and certain than the balloon.

Elderberry or Sambuci Wine.

Mr. Alfred Speer, of Passaic, New Jersey, produces wine from cultivated Portugal sambuci, which is a pleasant beverage, and said to be a valuable tonic for invalids.

The history of this wine, and its manufacture by Mr. Speer, may not be uninteresting to our readers.

It is made from the juice of cultivated sambucus, a species of elder, native of Portugal. The fruit is rich in saccaharine matter, and very different from our native elder. This fruit is being cultivated from imported seed, by Mr. Speer, in New Jersey, from which he produces a wine that is no doubt pure, without the use of alcohol, spirits or sugar.

Mr. Speer employs a new and improved process of fermentation, which requires four years to complete, being two years in wood and two years in glass.

First year it is kept in large casks with valve bungs, to allow the gas to escape and at the same time prevent the oxygen of the atmosphere from coming in contact with the wine.

Second year racked to small casks, and moved to another building of a different temperature.

Third year, drawn off in bottles which are piled away in stacks ; then completely covered with sand, which is kept at a certain temperature, from 95° to 100 Fah., all the year round, by which the vegetable extractive matter the wine held in solution, and the ferment or nitrogeneous matter, become precipitated and form a deposit, which, when taken out leaves the wine pure and free from the exciter of acid, with no disposition to go into the acid fermentation ; consequently no occasion for adding liquor or spirits to preserve the wine. In other words, the exciter of the acid fermentation is all extracted from the wine, instead of liquor being needed to counteract its effects and neutralize it, as is the general old practice in wine making.

Fourth year the bottles are dug out, the wine decanted in fresh bottles and laid away, being kept in another temperature until the end of this year, when they are sealed, labeled and packed ready for shipping.

The principal part of the whole operation is the management of the temperature in the rooms and cellers. After four years, it becomes unchangeable and ready for market in any climate.

Renovated Old Flint Muskets.

The Cincinnati *Gazette* says:—"It being generally supposed among our volunteers that the old flint-lock muskets are unfit for use, even when altered to percussion locks and rifled—that the barrels are worn out, and that it is exceedingly dangerous to attempt to discharge a load from one of them—Captain Neereamer, who is now in this city inspecting the alteration of these muskets, determined to give the matter a thorough test. Accordingly he selected one from those which he had rejected as unfit for firing, and yesterday morning attempted to burst it in a yard attached to Greenwood's foundry. Ten shots were fired from it without accomplishing the desired result, although the last round contained 218¾ grains of powder and five Minié rifle balls. Mr. Greenwood has just finished rifling the fourth thousand of these old muskets. With the alteration and repairing they get at the foundry, they are said by competent judges to be equal to the Enfield rifle for all military purposes. The saving to the government by this process is not less than $20 on each musket."

New Paste from Wood.

A new paste, designed to take the place of glue and starch for many purposes, has been lately manufactured in London by C. Stevens. It is made as follows: The wood is first reduced to fine shavings, then these are boiled in a strong lye of caustic soda or potash until all the fibers are separated. The best woods used for making the paste are poplar, pine, beech, spruce pine, and most woods termed "soft." When boiled a sufficient length of time for the softening of the fibers of the shavings, the fibrous matter is withdrawn into open vats, and exposed to the air for several days, when it ferments, and the whole mass becomes soft and glutinous. It is now cut up in machines like those employed in paper mills for cutting and grinding rags to make paper stock, when it become fit to be boiled in water, and is converted into a vegetable cement. Such a paste can be manufactured in great quantities and at less cost in America, than in any other part of the world.

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Work Resumed on the Mont Cenis Tunnel.

A French paper, the *Ville de Paris*, has an account of the present condition of this work, which we translate as follows :—

We have received a letter on the subject of the difficult piercing of Mont Cenis which we believe it a duty to reproduce in order to make our readers acquainted with the situation of the works, and to enable them to appreciate the enormous difficulties which it has been necessary to overcome in the prosecution of this prodigious enterprise.

The whole system of perforation has been in activity for a month, and there is no ground to fear any disappointment. The compressed air will make its way through the seven miles of rock before which the works are established.

The following are the principal results demonstrated, and their importance is decisive :

The five compressers which are mounted have worked for two months with all desirable regularity. They yield a useful result in compressed air of 70 per cent at least ; but there is reason to believe that it is greater, and the engineers will soon measure it by a direct gage.

They have succeeded in rendering the reservoirs, the valves, the domes, the tubes and the compressers so tight as to reduce the loss of air by leakage to one two-thousandth part of the production. The pipe conducting the air from the compressers to the drills is more than a mile in length, and it has been impossible to detect the least leak in it from the beginning. This is the more remarkable as the pipe is exposed to a temperature ranging from zero to 100° Fah.

It has been impossible, with the metallic manometers employed, to detect the least difference in the pressure at the two ends of the pipe. At the reservoirs, and at the perforators, the pressure was constant at five atmospheres (75 lbs. to the inch.)

The perforators operate in the most satisfactory manner, of which the most certain proof is that at a distance of a mile from the generators, when the rock is homogeneous, they make holes to the depth of 3½ and 4 inches per minute. The operations of advancing and withdrawing the perforators, injecting water, &c., are made more quickly even than the inventors expected. Finally, none of their anticipations have been disappointed, and the apparatus leaves nothing to be desired.

Government Railroad Transportation.

The government pays for railroad transportation according to the following rates :—Per passenger, per mile, 2 cents for distance moved. Equipments, munitions, and supplies accompanying regiments, 30 miles or less, 10 cents per 100 pounds ; 50 miles, 15 cents per 100 pounds ; 100 miles, 25 cents per 100 pounds ; 150 miles, 40 cents per 100 pounds ; 200 miles, 50 cents per 100 pounds ; 300 miles, 75 cents per 100 pounds ; 350 to 400 miles, not exceeding 90 cents per 100 pounds ; special express trains, $1 per mile.

One animal counts as 3,000 pounds ; 2 animals count as 4,000 pounds ; 3 animals count as 6,000 pounds ; 4 animals count as 6,500 pounds ; 5 animals count as 8,000 ; 6 animals count as 9,000 pounds ; 7 animals count as 10,000 pounds ; 8 animals count as 11,000 pounds ; 9 animals count as 12,000 pounds ; 14 animals, 18,000 pounds, count as a full car load.

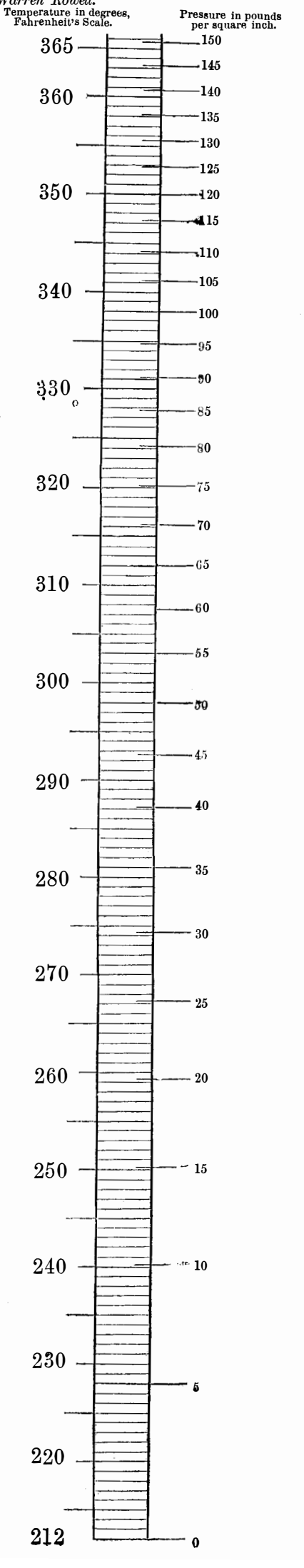
Provisions and heavy freights, 2 to 3 cents per tun of 2,000 pounds per mile. Dry goods, clothing, and light goods, 3 to 5 cents per tun of 2,000 pounds per mile. One large car load is reckoned as 9 tuns.

THERMOMETER AS A STEAM PRESSURE GAGE

As the temperature of steam varies constantly with the pressure, the latter may be measured by the former ; and hence a thermometer, inserted in the steam space of a boiler, becomes an accurate gage of the pressure. To enable engineers to see at a glance the pressure corresponding to any degree of temperature, we have had engraved the following scale, which has been drawn from Regnault's table, by Dr. Warren Rowell, of this city. Any engineer desiring to use it will of course cut it out and paste it up by the side of his engine. One great recommendation of a thermometer gage is, that it is never out of order.

Mr. G. Tagliabue, 298 Pearl street, manufactures thermometers with the figures indicating the pressure engraved upon the plate opposite the figures of the corresponding temperature.

Reignault's Table of Steam Pressure and Corresponding Temperature, Drawn to Fahrenheit's Scale, by Dr. Warren Rowell.



Products of the Asphodel.

Sir W. J. Hooker, F.R.S., gives the following interesting account of the asphodel and its properties, in the *Technologist*, published in England :—

Every one is familiar with the pretty, lovely-looking, white-flowered asphodel of our gardens. In the south of Europe, and apparently on both sides of the basin of the Mediterranean, the plant (*Asphodelus ramosus*) is extremely abundant ; though it has never, so far as I know, been turned to any account, except that in times of scarcity its acrid fasciculated roots, after much boiling, have been eaten by the poor. In the Paris Exhibition of 1855 there were shown bottles of alcohol extracted from the asphodel ; specimens of the residuum of the roots after being twice distilled ; paper stuff from the stalks and leaves of asphodel—card-paper, cards, paper and writing-papers of various qualities, manufactured from the same, and mixed in various proportions with rags and common paper stuff. M. de la Bertoche, in a pamphlet, asserts that asphodel roots contain upward of 27 per cent of alcoholic principle, or more than double the quantity which resides in the roots of beet. The stalks and leaves contain a remarkably tenacious fiber, fine, strong and flexible. The distillation of asphodel root has been already pursued, and with considerable success, in Algeria ; but the immense abundance of the plant in Tuscany, where it has hitherto been considered only a pernicious and most ineradicable weed, points to the advantage of endeavoring to turn it to account. The fasciculated roots, after cleansing and crushing, are mixed with water, and the fluid is exposed to heat so as to facilitate fermentation. The alcohol which it yields is pure and colorless, perfectly transparent, and has the color of alcohol itself. It contains neither acid salt, nor oily matter ; it burns without leaving any residue, and the flame is remarkably bright. But at the present time, when material for paper seems likely to fail, a most important succedaneum is afforded by the remains of asphodel. It is undeniable that the residuum of the roots after distillation, together with the other parts of the plant are eminently adapted to this object. Three processes are necessary : the separation of the useful portions—the bleaching—and the reducing the substances into a homogeneous and tenacious pulp. The first is better effected by crushing than by grinding, as the latter mode is apt to destroy the fiber. The second operation involves most difficulty, as the root is covered with a skin which contains a tanning principle ; and it is necessary, unless the expensive mode of hand-picking the root be adopted, to expose the substance to air and light, aided by immersion in diluted chlorine, which brings the substance to a very pale brown tint which is not objectionable for many sorts of paper. For the third process, that of reducing the whole mass to a smooth and tenacious paste, the paper manufacturers must supply the details.

Manufacturing and Business in Philadelphia.

The *United States Gazette* says :—"The manufacturing establishments of Philadelphia are active. At the Kensington Iron Works two hundred men are now working full time, and wages to the amount of eighteen hundred dollars are paid weekly. The force at the Pennsylvania works is also fully employed. At the shipyards where the new gunboats are building, there is great activity. The *Itasca* will be ready for launching in about two weeks, and the *Scioto* will be ready in about three weeks. The engines for these two vessels will be placed on board at the time named in the contract with the government. Several hundred men are employed in different parts of the city, making tents, guns, and clothing for the army ; the number employed in the last-named branch being four thousand. At the Navy Yard there are now about seventeen hundred men employed, and there is not likely to be a decrease for some time. The ship carpenters are in force there, the number being greater than all the other mechanics combined. Mr. Cattell has a large number of looms at work manufacturing cloth for winter clothing, and we understand that several other mills will soon be in operation. A large number of stock-weaving frames have recently been put into operation also."

GROWING MUSHROOMS.—At a recent sitting of the French Academy of Sciences M. Labourdette sent in a paper on a method of his for developing the size of the esculent mushroom, *Agaricus Campestris*. He prepares a bed exclusively formed of sulphate of lime (common building-plaster) beaten down to perfect hardness, without any manure but nitrate of potash (saltpeter). The nitrate is buried in the sulphate together with the spores of the mushroom, at a depth of from three to four millimeters (one sixth of an inch). This done, the bed will indefinitely produce a variety of the agaricus, which our author proposes to distinguish by the epithet of gigantic ; and not without reason, since the agaricus, cultivated in the usual manner, rarely exceeds 100 grammes in weight (3 ounces), while by M. Labourdette's method it attains to an average weight of 19 ounces.

THE MEANINGS OF CORN.—In Scotland when the word corn is used it is universally understood to signify oats ; in England it means wheat ; and in the United States, maize.

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Trial of an Enormous Wrought-Iron Gun.

[From the London Engineer, August 16.]

The trial of the 13-inch wrought-iron Mersey gun, better known as the Horsfall gun, took place last week at Eastney Fort, Portsmouth. The dimensions of the gun are as follows :—Length from breech to muzzle, 15 feet 10 inches ; length of bore, 13 feet 4 inches ; diameter of bore, 13 inches ; weight of gun, 21 tuns, 17 cwt. 2 qr. The weight of the carriage is 7 tuns 1 cwt. 1 qr.; weight of the shot, 280 lbs. The piece was not mounted, but placed on balks of timber on the crown of the beach, and partially imbedded in the sand. It will be remembered that this gun had been previously tried at Shoeburyness. The following are the ranges obtained :—

At 5° of elevation, with 40 lbs. of powder, 2,234 yards ; at 10°, 3,388 yards ; at 12°, 3,835 yards ; at 5°, with 50 lbs. of powder, 2,463 yards ; at 10°, 3,523 yards ; and at 12°, 3,883 yards. The rounds fired at Shoeburyness were 97. The result was that a flaw was made in the breech of the gun to the extent 12 inches in the metal. To test the power of the gun still further two shots were fired from it yesterday. It was loaded with 80 lbs. of powder, one ball of 283 lbs. and a heavy wad. To prevent accidents the piece was discharged with a portfire of three minutes' elevation, when, contrary to all expectation, it stood well. The second shot was merely a repetition of the first, and the result was the same. It is said that this enormous piece of ordnance is to be mounted where it now is, and is to be tried against armor plates.

Influence of the Electric Light on Vegetation.

At a recent sitting of the Academy of Sciences at Paris, M. Hervé Mangon communicated some highly interesting researches concerning the action which the electric light exercises on vegetable life. On the 30th ult., at 8 a m., he exposed four flower-pots, each containing four grains of rye, which had peen sown on the 24th, 26th, 27th, and 28th ult., to the action of the electric light produced by two pencils of coal and an electro-magnetic machine put in motion by a steam engine. The pots were placed a little below the level of the focus, without the interposition of any lens or glass, and at a distance of about one meter, the light of day being carefully excluded from the room where the experiments were conducted during four consecutive days, and for eleven or twelve hours each day. The rye sown on the 24th and 26th had sprouted, and grown to the hights of half a centimeter and 42 millimeters respectively. One of these little plants displayed a slight beginning of green at the top, but the others were all white. The seeds sown on the 27th and 28th had not yet sprouted. On the second day of the exposure, viz., the 31st, at 2 p. m., the plants of the 24th and 26th had grown to 1 centimeter and 60 millimeters respectively ; they were all very green, and strongly bent towards the light. The rye sown on the 27th had sprouted, and a little green was perceptible at the top of some of the plants. On the 1st of August all the plants were found thriving, as if under the influence of the sun. The rye sown on the 20th of July had sprouted, but showed no trace of green then ; on the following day, however, the 2d of August, it was quite green, the other plants continuing to develop themselves regularly. Other pots where rye had been sown, and which had been kept quite in the dark for comparison's sake, produced nothing but yellow plants. Hence M. Hervé Mangon concludes that the electric light possesses, like sun light, the property of developing the green matter of vegetables.

Improved Titanium Steel.—A patent has lately been taken out in England by R. Mushet, a distinguished steel manufacturer at Coleford, for an improved quality of steel obtained by mixing some pulverized titanium ores in a crucible with cast steel or refined iron, used in making cast steel and smelting them together.

It has been stated by several of our cotemporaries that the Russian government designs to connect the Asiatic and American possessions of the empire with a telegraphic cable passing through Behring's straits. A Russian officer is about to be sent to the Northwest American coast to ascertain the most suitable place for a telegraphic depot.

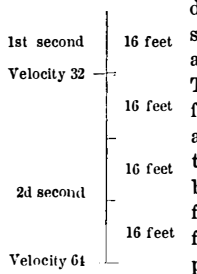
THE POWER OF A MOVING BODY—THE SIMPLE FACTS OF THE CASE.

Notwithstanding all the volumes that have been written in discussing the power of a moving body, the facts may be very briefly stated.

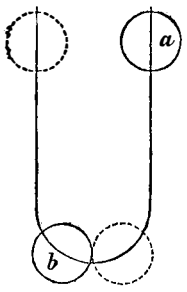
If a mass of matter moving with any given velocity requires a certain amount of resistance to stop it, the same mass moving with twice the velocity will require four times the resistance to bring it to a state of rest. That is to say, the power of a moving body is not proportioned directly to its velocity, but to the square of its velocity.

For instance, if a weight moving ten feet in a second will break one bar of iron, the same weight moving twenty feet in a second will break four bars of iron. If a stream of water having a fall which gives the water a velocity of five feet per second will drive three runs of stones, the stream with a velocity of ten feet per second will drive twelve runs of stones.

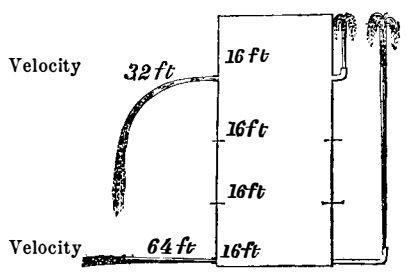
This is very clearly shown in the effect produced by *falling* bodies. If a body fall in vacuum, the gravity of this earth will draw it down 16 feet in the first second of time, and will give it a velocity of 32 feet in a second. The 2d second, the body would fall 32 feet if gravity ceased to act upon it. But as gravity continues to act, it will carry the body 16 feet further, making 48 feet in the 2d second, or 64 feet in all from the starting point. The velocity is also doubled, making it 64 feet per second.



Now the power of a falling body is exactly proportioned to the hight from which it has fallen. If two perfectly elastic bodies of equal weight, *a* and *b*, slide freely on a curved rod, and the body, *a*, be allowed to fall against the body, *b*, it will impart all of its motion to *b*, and raise the latter to the same height as that from which *a* fell. If *b* weighs 1 pound and rises one foot the power of *a* is equal to one foot-pound of work. But if the bodies weigh ten pounds apiece, and move through a vertical space of ten feet, then the work done by *a* is 100 foot-pounds. The velocity of *a*, it will be remembered, is not proportioned to the hight from which it has fallen, but the hight is in proportion to the square of the velocity.



Again, water issuing from a vertical orifice in the side of a vessel has the same velocity as a body falling from the surface to the level of the orifice ; that is to say, if the opening be 16 feet below the surface, the water will issue with a velocity of 32 feet per second, and if the opening be 64 feet below the surface, the velocity of the jet will be 64 feet per second. It is well known that the power of water is directly proportioned to the hight of the head, and this is in proportion to the square of the velocity.



That the power of water issuing from an orifice is proportioned to the head under which it issues, or its depth below the surface, is clearly shown in the ascent of a vertical jet. If the pipe through which the water issues be turned up so as to cause the jet to rise vertically, it will, if there is no resistance from the air or from friction, rise to the level of the surface. Hence, a pound of water issuing under 16 feet head has sufficient power to raise one pound 16 feet—to do 16 foot-pounds of work. And a pound issuing under 64 feet head has sufficient power to raise one pound 64 feet—to do 64 foot-pounds of work. But in the latter case it has only double the velocity that it has in the former, while the work that it does is fourfold.

In short, the law that *the power of a moving body is in proportion to the square of its velocity* is proved in a thousand ways. This power is called, by some, momentum, but philosophers give it the name of *vis viva*, using the word momentum to express a different idea.

The law is applicable to rotary motion as well as to that in a straight line. If a flywheel, turning 100 times in a minute has sufficient power after the steam is cut off to grind a peck of corn, the same wheel running 200 revolutions per minute will grind a bushel of corn before it stops.

The force required to impart velocity to a body obeys the same law. If it takes 100 cubic feet of steam to overcome the inertia of a flywheel in imparting to it a velocity of 100 revolutions per minute, it will require 400 cubic feet to give it a velocity of 200 revolutions per minute.

If it takes a given force to put a body in motion at the rate of 16 feet in a second, it will take four times the force to give it a velocity of 32 feet in a second.

It will be seen that all these facts are embraced in the general law :—"*The power of a moving body is in proportion to the square of its velocity.*"

Improvement in Lighting Streets.

One of our English cotemporaries states that "by placing near the flame of an ordinary gas burner a vessel containing naphtha, the brilliancy of the flame is much increased." This must be due to the evaporation of the naphtha, by which an increased supply of illuminating vapor is furnished to the flame. A patent has been secured for the improvement, and the patentee asserts that it will effect a saving of nearly one-half the expenses for lighting London with gas. To test the accuracy of this assertion, experiments have just been made in London, under the authority of the Commissioners of Sewers. Moorgate street was selected for the trial, there being in it few shops, and only one or two private lamps. The lamps experimented upon were twelve in number, six upon the western side, fitted in the ordinary way with burners, and consuming upon the average five cubic feet of gas an hour, and six upon the eastern side, fitted with burners having attached to them the apparatus of the patentee and consuming two and a half cubic feet an hour. This experiment extended over thirty nights.

The burners without the apparatus consumed about 439 cubic feet per hour, while the burners with the apparatus consumed only 209 cubic feet per hour.

The district inspector of the commission, who saw the lamps nightly, reported his opinion that the light given was perfectly equal ; but Mr. Heywood, the engineer of the commission, who principally conducted the experiments, believes that the lights are not quite equal in intensity. He states that three cubic feet of gas, carbureted, by means of the naphtha are equal to five cubic feet of gas not carbureted. On this assumption he shows that by the adoption of the new process, the reduction of the cost of each lamp a year would be 20s., (about $5.)

The naphthalizing of flame to increase its brilliancy was proposed many years ago, and is described in Parnell's treatise on gas lighting, but we are not aware of its ever having been applied to street lamps before. Naphtha, owing to its offensive odor, is totally unfit for application to gas lights in the inside of buildings, but it may be an economical application of lights in the streets. It has, however, too much the appearance of the old oil-can system, which has been happily consigned to oblivion in civilized cities.

To Remove Ink from Paper, &c.—The process of thoronghly extracting all traces of writing-ink, whether accidentally spilt or written in error is to alternately wash the paper with a camel hair brush dipped in a solution of cyanuret of potassium and oxalic acid ; then when the ink has disappeared, to wash the paper with pure water. By this process cheques have been altered when written on "patent cheque paper," upon which it was supposed by a recent inventor to be impossible to remove writing. —*Septimus Piesse.*

The London *Evening Mail* states that British railways indicate the general condition of a country with greater accuracy than national funds. "The dividends which are declared by railway companies are influenced by every incident affecting the condition of the people."

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Correspondence

Experience with Western Rifles.

Messrs. Editors:—I will give you some of my experience with rifles. I have used rifles a great deal during a residence of more than twenty years where game and good marksmen have been plenty, and where a great variety of rifles have been used. I have tried every rifle that I could get hold of, for the purpose of testing their qualities; and I have shot a great deal at targets and different marks, and have killed much game, from deer to small birds.

I prefer a rifle with a "regular twist," making one turn in six feet. I have tried two rifles of the same mechanic's manufacture, both loaded with sufficient powder to cock the hammer when discharged, thus showing they had a full charge. Both barrels were 3½ feet in length; the even twist carried 42 balls to the pound, weighed 15 pounds, had one turn in six feet, and 7 furrows in the bore. The other rifle had 7 furrows in the bore also, made one turn with increasing twist in 4½ feet, carried 38 balls to the pound, weighed 16½ pounds, had a steel chamber and was furnished with powder in proportion to its bore. The powder, lead, patches and balls fitted alike. In shooting at a target of solid oak, to test their powers of penetration, the bullet of the regular twist rifle penetrated 5 inches—that of the increasing twist 4½ inches. When tried at different elevations the even twist obtained the greater range; its crack was clearer, and the fire was quicker with the same kind of powder. I have oftentimes tried these rifles, and invariably with like results. I have also obtained similar results with the other rifles I have used. Rifles having a regular twist—both at target shooting and in hunting, particularly deer, where a long range is desired—have always done best in my hands. I have often dug out the bullets from the soft river bottom to examine them. Those discharged from rifles having "a gaining twist" of furrows were seldom, if ever, perfect; while the bullets discharged from a regular twist rifle were generally perfect. The marks of the grooves were plain in all instances, and the furrows in the bullets discharged from the rifle having an even twist were uniformly regular, while the bullets discharged from rifles having a gaining twist were generally torn, sometimes entirely across the furrows. In the even twist rifle the bullet always follow the furrows, but in rifles having an increased twist the bullet frequently cuts across the furrows at the muzzle, and when this occurs good shooting cannot be certain.

The longest range rifles which I have tried, or have seen tried by others, were 3½ feet and over in length of barrel. I have tested short rifles to my satisfaction, and so have all the marksmen in this region. Short rifles cannot be sold, to any extent, to Iowa hunters. For any service, I would prefer a rifle with a 3½-feet barrel, ½-inch bore, regular twist, side lock and French trigger. As a mounted rifleman I would prefer to use a revolving rifle. John W. Walton.

Muscatine, Iowa, Aug. 27, 1861.

[The object of an increasing twist in rifles is to start the bullet slowly in its rotation, but a uniform twist is perhaps the best, because the ball starts in all instances with a lower velocity than when it leaves the muzzle. There is less danger of a bullet stripping in a regular twist rifle. But great deference must be paid to the experience of many of our best rifle makers and marksmen, who prefer an increasing twist. Wesson, James, Fish, Clark and other noted rifle makers, all make their target rifles with a "gaining" twist. On the other hand, the Maynard breech-loading rifles, manufactured at Chicopee, Mass., have barrels of a regular twist, and the shooting reported to be executed by them is unquestionably good. The celebrated English Whitworth rifles have also regular twist grooves. There is therefore a difference of opinion as to the advantages of regular and increasing twist in the grooves of rifles.

There is also a great difference of opinion respecting the rapidity of the twist in rifles. In the common Whitworth rifles, the turn is once in twenty inches; that of the Maynard rifle of half-inch caliber, one turn in five feet, while the common target rifles with increasing twist commence with one revolution in six feet, ending at the muzzle with one turn in thirty-six inches. The twist of a rifle must vary with the size of the bore: the larger the bullet the longer the twist, so that the rotation may be proportioned to the circumference of the ball. We have never seen any reliable data respecting the proportion of twist to the bore of rifles. The manufacturers of rifles appear to be "at sea" among themselves on this topic.

As regards the best length for the barrels of rifles, it is well known that the Western hunters prefer the long rifles, but the best target shooting at the East has been executed with rifles of moderate length—not over 34 inches. Mr. Chapman is inclined to be jocular respecting the partiality of Western hunters for long rifles. He states that Gen. Dunham, of West Troy, N. Y., was wont to indulge in shooting across the Hudson river with a 12-inch Wesson pistol, and generally succeeded in hitting a flour barrel every time at a distance of 600 yards—"a nut for those to crack who are intrenched in long barrels and large calibers." It appears to us that the partiality of riflemen for different rifles, depends greatly upon the kind with which they first commence to practice and with which they first learned to be marksmen. Rifle making is an art, and a very important one, requiring great practical skill, but it is not yet a scientific art, because there is such a variety and contrariety of opinion and practice respecting the twist, the length of barrel, and other essential features belonging to rifled fire-arms.

Appreciating Professional Services.

The following letters we select from a number equally complimentary, evincing the sentiments of patentees whose business has been transacted through this office:—

Messrs. Munn & Co.:—I am pleased to acknowledge the promptness with which my business with the Patent Office has been so satisfactorily closed under your care and management. And to all who are in need of assistance at the Patent Office I would cheerfully say, that for energy and business qualifications your firm can be relied on. This I speak from experience, as well as from your general reputation. H. Van Dewater.

Weedsport, N. Y., Aug. 30, 1861.

Messrs. Munn & Co.:—I have been absent from home for a week, which has prevented my attending to your letter of the 15th inst., announcing the issue of my patent. I thank you for your kind wishes on my behalf—am confident that the patent will prove remunerative when business revives, which cannot be until we of the free States, in our overwhelming superiority of men and means, and the justness of our cause, once more restore law and order, and give stability to the western world. Three-fourths of the voters of this town have left for the war. You may rely upon my using my influence in your behalf, both for your valuable paper and as agents for procuring patents. I can cheerfully testify to the promptness and success which characterize your labors in behalf of your clients.

Augustus Reeve.

Allowaystown, Aug. 24, 1861.

Messrs. Munn & Co.:—We are in receipt of your letter announcing the successful issue of the patent case which we intrusted to your agency, accompanied with official notice. The gratification with which this notice was received can only be appreciated by those who have spent months of time, and much money, in perfecting an invention, and have experienced the anxiety and solicitude of an inventor while his invention was being subjected to the last ordeal—the scrutiny of the Patent Office. This anxiety would have been nothing if our confidence in you had been as complete as it is now, after becoming personally acquainted with your manner of doing business. When we placed our case in your hands we knew but little of you personally; but we have now proven your honesty and fidelity to the interests of your clients by the only certain and sure evidence—experience; and we cheerfully endorse all the testimonials of proficiency and fidelity in the performance of your professional engagements which have been accorded by others. A testimonial from us may not be as valuable as from such men as Commissioners Mason, Holt and Bishop, who have all recommended your agency above others, yet it is as cordially given. It is well known among those who are personally acquainted with us—they are many—that we never flatter for the sake of flattery, or praise for the sake of being praised in return. We have lost much, in a pecuniary sense, by not doing it; yet it was not our style and could not be done. You will find enclosed a draft—$20—for the payment of the last installment of the government fee. We deem it useless to urge you to be prompt in forwarding our papers, as promptness seems to be a part of your business plan.

Asa Forrist,
C. A. Wheeler.

Mt. Vernon, Iowa, Sept. 7th, 1861.

P. S.—We have several cases which we shall present through your agency as soon as things get settled again.

A. F. & C. A. W.

A Private Bottle Wanted.

Messrs. Editors:—The writer of this is in a delicate state of health, being very nervous and expectorating profusely; I am proprietor of a fashionable drinking saloon, whose patrons are continually soliciting me to take "a smile." Of course, I cannot refuse without depriving my own house of a shingle, and shaking that confidence which patients put in physicians who swallow their own medicines. But I might as well dig my own grave with my teeth as to drink upon every invitation. I therefore wish to have a private bottle containing something which will benefit my health and not injure my pocket.

You will confer a great favor by stating in your columns what I ought to keep in *that* bottle, and what drinks would be most beneficial to my state of health. You will probably tell me to apply to a physician. I intend to do so, but am desirous to get your advice. M. C.

Boston, Mass., August 6, 1861.

[The very best liquor for your private bottle is a compound of 8 parts of oxygen to 1 of hydrogen, called by apothecaries *aqua pura*, and in the Anglo-Saxon, pure water. The only known remedy for nervousness like yours is a blister in the palm of the hand, raised as directed on page 100 of our current volume. As you ask our advice, it is to pull down your "shingle," which, if you think of it, you will see is not a very nice one for a man's name to be on, and enlist in Gen. McClellan's army, where the strict discipline will remove you from any liability of falling into the most destructive of all habits, to which you are now so dangerously exposed.—Eds.

A Common Meridian to be Adopted.—Lieutenant the Hon. Delaporte French, with a party of one corporal and six sappers of the Royal Engineers (Ordnance Survey Department), arrived at Folkestone from Southampton on Thursday, Aug. 8th, and in the afternoon crossed to Boulogne in the South-Eastern Railway Company's steamboat, the *Princess Mary*, for the purpose of connecting the triangulation of Great Britain with that of France and Belgium, in coöperation with a commission appointed by the Minister of War of France. The ultimate result to be obtained is the substitution of one meridional line for the three lines of Greenwich, Paris and St. Petersburg, that are at present in use in different countries, and thus to harmonize the maps of different countries. The party took over camp equipage for six men, consisting of observatories, marquees, &c., packed in two ambulance wagons; and they are expected to be absent from England about eight months. The connection of the French and Russian systems will be carried out by the officers of those countries.

Thinking on Shipboard.—Several months since the British ship *Star of the East*, while on her passage from Bombay for Liverpool was lost while beating through Mozambique channel. The ship and cargo were valued at $200,000, and in accordance with law and usage, an official inquiry was instituted as to the facts connected with her loss, at which the government, through an agent of the Board of Trade, was represented. The first witness examined was the sailmaker of the ship, who described the voyage and stated that when she struck she was about a mile off the shore. Whereupon Mr. Tyndall, the Board of Trade attorney, says to him, "Didn't you think it strange that the ship should be so close in shore?" Witness—"We're not allowed to think; there's only the cook and the captain allowed to think on board a ship." The answer was a sockdologer, and the representive of their lordships, after this brief exposition of sea law, made no more interruptions.

Harness Blacking.—Take isinglass, ¼ oz., indigo in fine powder, ¼ oz., soft soap, 4 ozs., glue, 5 ozs, logwood, 4 ozs., vinegar, 2 pints, ground black, ½ oz., bees-wax, 1 oz. Infuse the logwood in vinegar for some time with gentle heat, and when the color is well extracted strain the liquid and add the other ingredients to it; boil until the glue is dissolved, then put it into stoneware or glass jars. This blacking will be found very convenient for the harness of artillery and other army horses.

It is stated in *L'Invention* that an establishment has recently been erected in the plain of Gennevilliers at which a windmill is employed to compress air into large iron reservoirs similar to steam boilers, and then this air is used to work engines for driving machinery. The power of the wind is thus stored up to be used as wanted, and is brought under the most perfect control.

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How Friction Matches are Made.

The London *Chemical News* contains a description of the English mode of manufacturing those useful articles, "friction matches." We publish the substance of the article as it is one of much interest to our readers, because everybody uses matches, while very few persons are acquainted with the process of their manufacture.

The wooden splints for the matches are prepared from the best quality of pine plank perfectly dried in a room at a temperature of 400° Fah. About thirty blocks are cut from each plank, each block is 11 inches long, 4½ wide and 3 inches thick. A block is fixed with its small end downward, between two uprights. A frame, having about thirty lancet knives upon it, situated about one-eighth of an inch apart, is forced by a crank against the block, and immediately when the lancets are withdrawn, a swinging knife cuts off the scored surface in splints to the depth of one-eighth of an inch and 4½ inches in length. This operation is repeated until a whole block is reduced to splints, which fall into a receptacle below.

English splints are of two sizes—large and minikins; the larger are two and a quarter inches long (or double-length, as first formed, *i.e.*, four and a half inches) and the minikins are rather shorter.

In England the splints are square, in Germany they are cylindrical, and are prepared in this shape by placing the small block of wood with the ends of its fibers downward upon a strong plate of steel of larger surface, perforated over the greater part of its surface with holes of the size of the splint, countersunk at their entrances to form cutting edges, and as close together as possible. Great pressure being now applied to the upper end of the block, it is forced through all the holes, and reappears on the lower side of the steel plate in the form of a heap of cylindrical splints.

The English splints are collected as they are cut, and measured into bundles of six dozen each by a man who seizes a number of them in his hands from the loose and irregular heap, and by dexterous jerking, knocking and shaking, arranges them parallel to each other, then places them in a short open gutter or cradle, across which he has previously thrown a piece of string, and when the measure is full to the level of its edges, he ties up the bundle, throws it aside, and proceeds with another with equal rapidity. The bundles are then perfectly dried by exposure for several hours in a heated oven.

The bundle of splints are next coated at both ends with sulphur. A quantity of brimstone is melted in an iron pot, and one end of a bundle being quite scorched by contact with a red-hot plate is immersed into the melted sulphur to the requisite depth; then repeatedly swung in the air, to throw off the superfluous sulphur, and rolled violently upon its axis and beaten, to prevent the splints adhering together in one mass as the sulphur hardens. The other end is then similarly treated. In some cases the ends of the splints are saturated with wax instead of sulphur in a similar manner.

A boy now arranges the splints in a number of successive rows, one above another, in a frame, each splint separate from the others, in the following manner:—He takes a narrow wooden frame composed of three fixed pieces, a narrow bottom cross-piece about sixteen inches long and two inches wide, with two vertical pegs about eight inches high, one at each end, and has by his side about two dozen loose strips of wood of similar length and width to the bottom piece, and with holes or notches at their ends to receive the upright pegs; each of these strips has a series of fifty transverse shallow notches upon its upper surface to receive fifty splints, and is covered on its lower side with felt or other soft material. Having placed one of these strips upon the bottom piece, he takes up a handful of splints and quickly deposits fifty of them, one in each groove, their ends projecting one and a quarter inches on each side; he then places another strip upon the first one, and fills it in like manner, and so on until the pile of twenty-four rows is complete. A thicker strip of wood, similar to the bottom piece, covered upon its lower side with felt, is then placed upon the top, and the whole secured moderately tight by means of thumb-screws, or pegs fitting into holes in the uprights. The splints are then ready for being tipped at their ends with the phosphorus composition.

The exact ingredients, and their proportions, in the phosphorus composition, differ in different countries, but they all consist essentially of emulsions or mixtures of phosphorus in a solution of glue or gum arabic. In England the composition contains a considerable quantity of chlorate of potash, which imparts a snapping quality and noisy projecting flames, and but little phosphorus, on account of the moisture of the climate; other substances are also added to give hardness and power of resisting moisture. The following is about the composition of the best quality:—

Water	4	parts by weight.
Glue	2	" "
Phosphorus	1½ to 2	" "
Chlorate of potash	4 to 5	" "
Powdered glass	3 to 4	" "

In Germany the proportion of phosphorus used is much larger, and gum is used instead of glue, together with nitrate or peroxyd of lead, and no chlorate of potash. In consequence of the presence of so much phosphorus and the absence of chlorate of potash, the German matches light quietly, with a mild, lambent flame, and are injured quickly in a damp place by the oxydation of the phosphorus and the production of phosphoric acid, which attracts moisture. One of their mixtures, given by Böttger, is composed as follows:

Phosphorus	4	parts by weight.
Nitrate of potash	10	" "
Fine glue	6	" "
Red ocher	5	" "
Smalt	2	" "

In every case the glue is first broken into small pieces and soaked in cold water until quite soft, then added to the requisite quantity of water and heat applied by means of a water bath until it is quite fluid, and at a temperature of 200° to 512° Fah. The vessel is then removed from the fire, the phosphorus gradually added, and the mixture agitated briskly and continually with a stirrer, having wooden pegs or bristles projecting at its lower end. The chlorate of potash, coloring and other matters, all in a state of very fine powder, are then added, one at a time, to prevent risk of accident, and the stirring continued until the mixture is comparatively cool. By this means the minute particles of phosphorus are kept from uniting into large globules, and the heavier matters are prevented from sinking to the bottom.

In the process of tipping the ends of the matches a quantity of the composition is spread, by means of a large pallet knife, upon the horizontal surface of a smooth stone or plate of iron, heated by means of steam beneath. The mixture becomes much more fluid by the heat, and is spread to a width and length of about ten inches by twenty, and a uniform depth of about one-eighth of an inch by means of a horizontal gage. The "dipper" then takes a frame filled with splints, as already described, strikes the ends of the splints upon a bare part of the stone until the whole of those ends exhibit a flat, uniform surface. He then dips those ends either once, twice, or more times, into the mixture, until they have all received a proper amount, and hands the frame to a boy, who places it upon a rack in a current of air, in order that the composition may cool and harden. After a number of frames have been thus dipped, and the composition upon the splints in them has partly hardened, they are all taken, one by one, in the original order, and the other end of the splints tipped in a similar manner. With six dipping-stones, half-a-dozen workmen have dipped as many as twenty millions of matches in a single day. This method of dipping is termed "frame-dip;" but there is another process called "bundle-dip," which consists in taking a bundle of the sulphured splints, twisting it in such a manner that the ends of the splints spread out like a brush and separate from each other; they are then tipped with composition like the others. In this process the *ends* only of the splints acquire a coating of the mixture, whereas in frame dipping the composition extends a short distance up the *sides* of the splints and is more firmly attached. Bundle-dipped matches are inferior to frame-dipped ones.

In the manufacture as now being described it will be observed that each splint is 4½ inches long, coated with composition at both ends, and will therefore form two matches by being cut asunder in the middle; but this is not always the mode of proceeding; in some manufactories the splints are cut in two before being dipped, and are tipped at one end only.

As soon as the composition is partly dry, and of such a degree of hardness as to bear the next operation without igniting and without rubbing off, the splints (those coated at both ends) are quickly removed from the frames into parallel heaps. A man now takes a heap of fifty of the splints, places them between two vertical supports in a horizontal channel or trough of wood, passes a string with a weight over them to prevent their falling about, and cuts them through at their middle by means of a cork-cutter's knife, moving upon a hinge. He then places them in heaps of 100 each, ready for boxing. The little boxes are now filled by women and children, who perform the operation with exceeding rapidity, and before the matches are dry in order to avoid accidents. Each match passes through the hands of about seventeen persons, chiefly children, in its process of manufacture.

Trays of sawdust are placed near the various workmen and operators to plunge the matches into in case they ignite. Vessels of water are also freely at hand in case of accident. Also a quantity of sand is strewed in a layer of several inches deep beneath the racks upon which the frames of matches are set to harden, so that in case of a frame of matches falling, the flames may be quickly extinguished. A lotion, composed of olive oil and lime water, is exceedingly useful to apply to the skin in cases of burning by phosphorus.

Terry's Breech-Loading Carbine.

The London correspondent of the New York *Herald* gives the following account of this weapon:—

The gun now adopted and in use in the British cavalry, is Calisher & Terry's—or Terry's, as it is called—breech-loading rifle carbine. The barrel is twenty-four inches in length—full length thirty-seven and a half inches—and weighs altogether a trifle under six pounds. It has an effective range of over a thousand yards, is sighted for 1,200 yards, and will carry a ball, or rifle shell, 1,500 or 1,600 yards, or very nearly one mile. It has none of the objections made to Sharp's. The bore is the same as the Enfield, and fires a similar bullet—conical—one weighing about an ounce. The contrivance for loading and then closing the breech is one that sends a steel plug into the lower end of the barrel about the third of an inch. The ball protrudes naked from one end of the cartridge, and when fired entirely fills the bore and grooves, thus preventing windage. It is impossible for it to leak fire. By a singular and ingenious contrivance in the cartridge the gun lubricates and cleans itself, and does not become the least foul, even after firing thousands of times. At the lower or base end of the cartridge is a wad, cut out of heavy woolen felting, at least a quarter of an inch thick. This is saturated with grease, lard or tallow. The powder is between this wad and the bullet, and after the discharge the wad remains in the gun. Of course the wad goes out before the next bullet, and as the gun grows warm by firing the grease melts, and the gun is lubricated and cleaned out at every discharge. One of these rifles was fired eighteen hundred times in succession without cleaning or examination, under the inspection of some officers at Portsmouth, and was then pronounced clean and in as good condition as when the experiment commenced. It missed fire just twice in the eighteen hundred discharges. Terry's breech-loading rifle was invented six or eight years ago, and has now the enviable distinction of being exclusively used by the British cavalry, hussars, dragoons and mounted riflemen, and the only breech-loader in use in the British army and navy service. As the London *Examiner*, a paper of great weight and authority, said, in a review of the late rifle contest at Wimbledon:—"The muzzle-loading rifle is doomed, and soon the breech-loader must take the place of the Enfield." The *Examiner* pronounces Terry's the "only breech-loader worth naming." It carried off several prizes at Wimbledon, and has been adopted by both the Australian and New Zeland colonial governments for both mounted and foot soldiers. If we ask why the British government do not adopt it for their foot soldiers, we get very sufficient reasons. The arm has only just been introduced, and at this time the government have hardly got through with making and distributing the Enfield, and the supply for the army has taken up some seven years to complete. Besides, the cost of small arms for a force of two hundred thousand men, at five to eight pounds sterling per gun, amounts to no less than six or seven million dollars. The first step has been to put Terry's breech-loader into the hands of the cavalry, and also to supply the navy with it—a good many small arms being required in boarding and firing from the round top on shipboard, and one is needed that will admit of the most rapid loading.

Several other breech-loading rifles are in the English market, among which may be named Westley Richards's and Henry's. These guns are neither of them equal to Terry's, though Henry's had been lauded by some of the journals. The *United Service Gazette*, the *Times*, the *Examiner*, the *Morning Herald*, and several other journals have given elaborate articles, with descriptions and accounts of the practice and use of Terry's rifle. It being confessedly superior to any other soldier's tool in the English market, is a sufficient apology for devoting the space that I have to its description. Terry's infantry gun—exactly like the carbine, only longer—is the neatest looking rifle I ever saw in my life.

The carbine costs here about £6 sterling. The government furnishes the stocks and gets them manufactured by contract for about £5. In America they would cost about the same as Sharp's carbine—not far from $35. This is the breech-loading gun of the British service, the most effective small arm in use in Europe—Calisher & Terry's breech-loading rifle.

Miasm.

On the wings of the viewless winds in September, the sickliest month of the year, there is wafted an agency of disease and death, so ethereal in its nature, so intangible to mortal sense, so insinuating, so all-pervading, that no alembic can detect its presence, no prison-bar or palace-gate can prevent its entrance. It is called "Miasm;" it is an emanation from the surface of the earth wherever there is vegetation, moisture, and heat equal to 80°, and is the fruitful cause of many diseases which ravage whole communities at a time, such as agues, fevers, diarrhea, dysentery, cholera, pestilence, and plague. But its laws are known, and its destructive agencies can be averted by avoiding exposure and fatigue in the out-door air for the hours including sunrise and sunset, at which times a hot breakfast and supper should be eaten, by a good fire, in all prairie, flat, water course, and lake and sea-shore situations. If the common people could only be induced to take these simple, easy, practicable, and comprehensible precautions, these diseases would be prevented as epidemics, or arrested in their progress, as certainly as that care can prevent the firing of a town, and that water will put it out. These are the teachings of science, and experiment has demonstrated their truth beyond a cavil. Yet who will take these precautions?—*Hall's Journal of Health*.

THE BLOCKADE FELT.—The Savannah *Republican* says that "the stock of flannel having been pretty well exhausted in the Southern markets," it will be doing a public service by suggesting that a very excellent substitute may be found in the "common coarse Georgia osnaburgs."

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Improvement on Giffard's Injector.

[From the London Engineer.]

This Invention, by Thomas Hunt, of Crewe, relates to certain improvements upon and modifications of what is known as "Giffard's feed water injector," whereby a more regular and continuous supply of water is obtained, and the apparatus is rendered generally more regular in its action. For this purpose a chamber or reservoir is placed in close proximity to the steam-jet nozzle of the injector, or such portion of the injector is surrounded by a chamber or reservoir of sufficient capacity to contain as much water as will feed the injector at a uniform rate, and neutralize any reaction in the current of the water between its source and the injector.

Fig. 1 represents a vertical section of an ordinary feed water injector with the improvements attached, and Fig. 2 is a sectional plan of the same taken through the principal parts. A A represent the outer shell or main body of the injector, and B is the reservoir or chamber which surrounds the steam-jet nozzle, and which is constantly supplied with water from the tender or other source of supply by the inlet pipe,

The reservoir or chamber B, in place of surrounding or inclosing the steam-jet nozzle, may, if preferred, be siturated on one side thereof, or in close proximity thereto, the lower portion only of the reservoir or chamber, B, or a branch leading therefrom, being made to surround the nozzle of the steam-jet pipe, the essential feature of the present improvement being the maintaining of such nozzle constantly surrounded by or immersed in the feed water when in action.

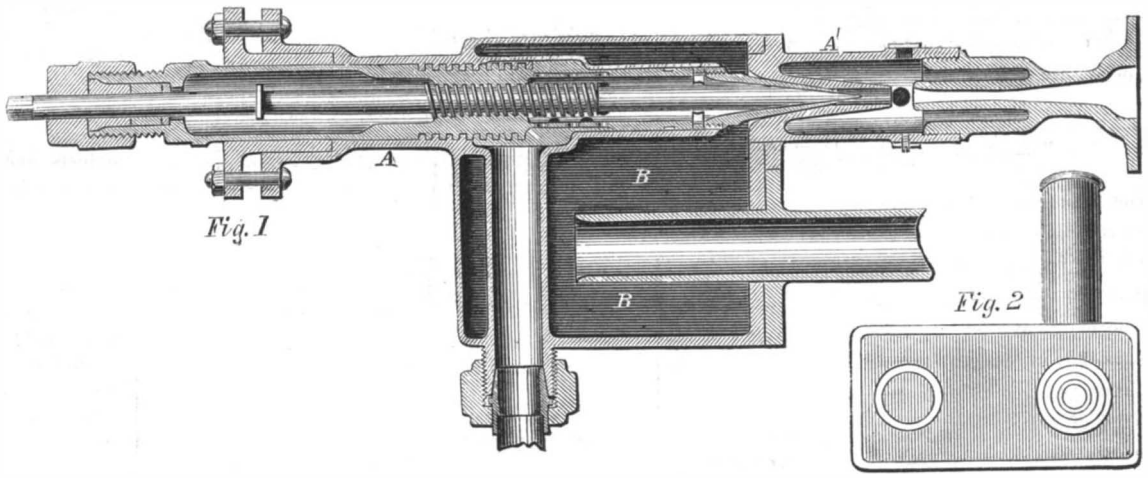

Fig. 1

Fig. 2

HUNT'S APPARATUS FOR SUPPLYING STEAM BOILERS WITH WATER.

THE AMERICAN PHOTOGRAPHICAL SOCIETY.

This society held its first meeting after its summer recess on Monday evening, Sept. 9th; President Draper in the chair, John Johnson, Esq., Secretary *pro. tem.*

Photographing from Balloons.—The President read a copy of a letter which he had addressed to the Secretary of War, stating the opinion of the society that photographs might be taken from balloons which would be of great value in military reconnoissances, and offering the services of the society in aiding the government to employ this valuable power. The President remarked that though the letter was sent more than a month ago, he had received no answer to it. This neglect he attributed to the overwhelming mass of business which the Secretary of War has on his hands.

Mr. SEELY remarked that probably the Secretary was not aware of the practical value of the aid tendered. A photograph from a balloon would be a perfect and minute record of the country observed, which might be examined under the microscope, and details brought out which would be invisible from the balloon.

Mr. TILLMAN regretted the inattention to their offer, but could see nothing further for the society to do in the premises.

The Rock Oil Explosion.—Mr. TILLMAN—At our last meeting I was speaking of the exceedingly explosive character of some of the rock oils; we have just had a startling proof of this in our own harbor. On Saturday evening the schooner *Cornelia* was burned at the wharf in Jersey City in consequence of an explosion from her cargo of rock oil. She had 800 barrels of rock oil on board, and one of the crew went into the hold with a candle when an explosion immediately took place, two of the crew were killed, and the vessel was instantly a sheet of flame; the burning oil ran out upon the water covering a portion of the North River with a bright fire, and several cars of wheat and one building were burned.

MR. CAMPBELL—The Fire Marshal says that it is proved that no candle was carried into the hold; showing that the fire probably originated from spontaneous combustion.

MR. TILLMAN—I do not see how rock oil could take fire by spontaneous combustion. There must have been a candle or some other fire on board.

MR. SEELY—There is one property of rock oil that may be mentioned in this connection; its extraordinary power of penetrating capillary tubes. It surpasses in this respect both water and alcohol, and, I believe, all other liquids. It will flow by the wick over a lamp and cover the outside, it will follow up the side of glass and thus escape from a bottle. If put into a wooden barrel it passes through the staves, covering the barrel upon the outside, and filling the air with its odor. I have stated here before that some of the hydro carbons which enter into the distillates of rock oil are more volatile than ether; and it is easy to see that if several hundred barrels of the oil were confined in the hold of a vessel some of the liquid would pass through the staves and the more volatile portions would rise and mix with the air forming a very explosive mixture. As the rock oils do not absorb oxygen they would never burn by spontaneous combustion. The extraordinary power of penetrating capillary tubes spoken of, I have never seen mentioned in print, but we have all observed it.

Technical Photography.—MR. SEELY gave an account of what had been done in the world of photography during the summer, and his remarks were followed by considerable discussion on technical points in photography, not interesting to many of our readers.

Ladies Invited to Attend the Meetings of the Society.—THE PRESIDENT—I have been asked if there would be any objection to ladies attending our meetings, there are a good many ladies in the city who are interested in photography, and some of them would be pleased to meet with us.

ALL THE MEMBERS PRESENT—One after another expressed the opinion that it would be very agreeable indeed to have ladies attend; and the Secretary was instructed to insert an invitatien to them especially as well as to the citizens in general, in his advertisements.

The Society adjourned to meet at their room in the University building, corner of University Place and Washington Place, at 7½ o'clock in the evening of the first Monday in October.

The meetings are held at the University on the evening of the first Monday in each month, and the public are cordially invited to attend.

SOCIAL SCIENCE CONGRESS.

One of the most important associations in the world is the one which exists in Great Britain for the cultivation of social science. It has now been in existence for several years, and its chief object seems to be the collecting of information and the reading and discussion of papers upon all questions affecting the welfare and condition of the whole people. The annual meetings are held in a different city each year, and at these gatherings nobles and plebians fraternize, and sociality is promoted among all classes. Intelligence and good sense are the passports to these meetings, and they may also be called "Womens' Rights Associations," as ladies as well as gentlemen take part in the proceedings.

This year the association held its annual congress in Dublin, with the venerable Lord Brougham as president. His opening address was a summary of the progress of social science during the past year. He touched upon almost every subject relating to law, education, industry and literature. He is a powerful advocate of coöperation among all classes for the purposes of effecting a common good. Unions of working people for conducting manufacturing operations, he stated, were spreading in England, and mechanics were now sharing the profits formerly secured entirely by chief manufacturers. About two hundred and fifty new companies of operative manufacturers were established within the past year. These coöperative societies are generally composed of sober and industrious operatives.

The reduction of the duty on paper which had been effected by act of Parliament was dwelt upon with great satisfaction. The benefits of cheap newspapers were pointed out with a feeling mind, but the American press received a rebuke in the declamation. There is one penny paper in London which has a daily circulation of 80,000 copies.

As regards the affairs of America, Lord Brougham said:—

On this most unhappy subject, it becomes us to abstain from whatever might be deemed to indicate an opinion upon the merits of the controversy. But we should ill represent the friends of science we cultivate if we did not breathe an earnest hope for the termination of a civil war, the real origin of which has been the disappointment of faction in the thirst for places, and which, as if to make it more respectable and more amiable, has assumed as its avowed principle the perpetuation and extension of slavery, now for the first time declared to be good in itself. Surely, without offence to either party in this lamentable contest, we may breathe a wish that the least of the war's evils—its heavy expense—were bestowed upon the redemption of the colored race, upon the amicable removal of the greatest obstruction to American prosperity, the greatest blot that rests on the American name. Humbly but deeply may we be thankful for the blessings we enjoy under our free and well-poised constitution, which leaves us toward other nations without "hatred and all uncharitableness," and certainly without envy; the blessings of being able to continue our labors in secure possession of freedom from all tyranny, whether of one or of the multitude—of individual caprice, so galling to our pride, or the more insupportable domination of the mob, so omnipresent that nothing is too high for it to reach, nothing so humble and obscure as to escape.

Animals and Animal Products Employed in Medicine.

An English paper thus sums up the number of animals and animal products which have been employed for medical purposes:—

At various times in the history of the medical art, animals and animal products have been largely used as healing substances. At one time this application brought into physic what is to us, in these days, a revolting spectacle. Even at the present hour, among the illiterate, old prejudices and superstitions prevail relative to the value of certain animals as curatives of incurable diseases, the narration of which would produce a nausea in the least fastidious. Among the animals and animal products which have been employed medicinally, as enumerated by M. Moquin-Tandon, may be included scink, wood lice, cochineal insect, pachydermata, sepiadæ, snails, oysters, coral, spermaceti, sponge, bile, crabs' eyes, spiders' web, oils from the livers of the cod, the skate and the shark, musk, civet, beaver, hyraceum, ambergris, cantharides, mylabris, cerocoma and meloe, leeches, galls, cases or vesicles produced by different species of aphides, the trebals, and, lastly, various parts of animals to be used as accessories to medicine, such as bones, blood, flesh, albumen, gelatine, fat, oils, milk, eggs, honey, wax, hair, and other horny bodies.

It would form a curious and interesting chapter to write an accurate account of the mode in which these numerous substances found their way into the laboratory of the physician; to trace why they possessed real or supposed uses, and why they have so many of them either faded into disuetude, or been replaced by something derived from them and now considered substitutional. To assume that all these remedies were without a use, that they were mere placebos, and acted solely by the faith they excited, would, we opine, be taking too much for granted as to the curative powers of belief and implicit trust. We have, in fact, one or two broad facts which show, on the contrary, that remedies long used and derived from the animal kingdom exerted an influence for good by virtue of certain true remedial agents which they contained, hidden, it is true, but on this account none the less valuable.

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INFORMATION AS TO THE PATENTABLE NOVELTY OF INVENTIONS.

The list of claims published from week to week in these columns, indicate truthfully the extent of business being transacted at the Patent Office.

It will be observed that inventors are far from being dormant, if they are not as numerous and active, as they were a year ago. Since the first of July we have received a great accession to the subscription list of this journal, and for the information of each, we would state that it is the custom, at the office of this paper, to examine models or drawings and descriptions of alleged new inventions, and to give written or verbal advice as to their patentability, without charge. Persons having made what they consider improvements in any branch of machinery, and who contemplate securing the same by Letters Patent, are advised to send a sketch or model of it to this office. An examination will be made and an answer returned by early mail. Through our Branch Office, located directly opposite the Patent Office in Washington, we are enabled to make special examinations into the novelty and patentability of inventions. Having the records of the Patent Office to search, and the models and drawings deposited therein to examine, we are enabled to give an inventor most reliable advice as to the probabilities of his obtaining a patent, and also as to the extent of the claim that it is expedient to set up when the papers for an application are prepared. For this special examination at the Patent Office we make a charge of Five Dollars. It is necessary that a drawing and description or a model of the invention should accompany the remittance. Address—

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THE BOMBARDMENT OF FORT HATTERAS—SHELLS AND BIG GUNS.

For more than 20 years the officers of the Ordnance and Engineering Departments of the United States Army have been advocating the introduction of very heavy guns into our sea-coast fortifications, and Commander Dahlgren, of the Ordnance Department of the Navy, has been laboring to arm our ships of war with his large shell guns. The action at Fort Hatteras has demonstrated in a very conclusive manner the wisdom of both of these innovations. It was by means of the shell guns on board the naval vessels that the fort was reduced, while there is no doubt that if the place had been armed with Rodman's 15-inch guns, or even with 10-inch columbiads, the ships would have either been driven away or very quickly blown to pieces. But as the forts had mounted only 32-pounders, the vessels were able to lie out of the range of these and to pour their shells into the fort in such a storm as to drive the garrison into the magazine. From Engineer Thompson's report it seems that some 10-inch columbiads were on the way to the fort, and one had actually arrived, though fortunately it was not mounted. It is quite possible that if that one gun had been ready for service, the action might have resulted in the sinking of a portion of our ships and the withdrawal of the remainder.

When shells were thrown from mortars at an angle of 45°, the hitting of a ship one or two miles off was a feat of rare accomplishment, but with one of the great columbiads, which send their shells at point blank or at moderate elevation, a ship can be hit at almost every shot, and a shell exploding in the side of a wooden ship is so terribly destructive, that but very few shots are required to send the largest man-of-war to the bottom.

Even before the great revolution in naval warfare effected by the introduction of shell guns, the attacks on land fortifications by ships were seldom successful, but to send wooden vessels against forts armed with these guns would be simple madness.

The money which has been expended by the nation in enabling our Ordnance and Engineer officers to make their investigations has resulted in giving us knowledge of immeasurable value in this crisis; it has been as profitably laid out as any portion of the national expenditure.

PHENOMENA ATTENDING COMBUSTION—GAS AND CANDLE LIGHT.

A most interesting lecture was recently given on the above subject by Professor E. Frankland, F. R. S., of London. He stated that he commenced experiments in 1849 upon the summit of Mont Blanc, in the Alps, for the purpose of ascertaining the amount of combustible matter consumed by a common candle at that and other elevations. He found, as the average of five experiments, that a stearine candle diminished in weight 9.4 grammes, when burned for one hour at Chamounix; and 9.2 grammes when ignited for the same length of time upon Mont Blanc. These experiments went to prove that the ratio of combustion was almost independent of the density of the atmosphere, as the pressure at the two places varied several inches in the barometer. But when burning the candle on the top of the mountain it was noticed that the flame was not so brilliant as in a more dense atmosphere. This led Professor Frankland to make experiments, on his return to England, with a flame of gas burning under different pressures of the atmosphere, produced by artificial arrangements. He passed the gas through a governor valve, secured a uniform flow in the burner, and the experimental flame was placed at one extremity of a Bunsen's photometer. Near this flame was placed a similar jet surrounded with a glass shade, but it was permitted to burn freely in the air so as to compare it with the other flame that was subjected to variations of atmospheric pressure. The products of combustion were completely removed and a fresh supply of air furnished regularly to the experimental flame. The following is a table containing a summary of results :—

Pressure of air in Inches of Mercury.	Illuminating Power of Experimental Flame.
30.2	100
28.2	91.4
26.2	80.6
24.2	73.0
22.2	61.4
20.2	47.8
18.2	37.4
16.2	29.4
14.2	19.8
12.2	12.5
10.2	3.6

This table exhibits a constant decrease of light in proportion to the diminution of the pressure of air, as indicated by the mercury of a barometer. This is important information, and it points out a method by which the luminosity of flame may be greatly increased. In the flame of gas and candles the luminosity is mostly due to incandescent solid matter consisting of carbon in a minute state of subdivision. The amount of light depends upon the quantity of solid matter existing in the flame, and upon the temperature to which these particles are raised. Combustion was found to be more perfect with rarified than with compressed air, and the temperature of the flame was not materially different. The question that seemed to puzzle Professor Frankland, was the decrease of luminosity of the flame with the decreased pressure of air, while the combustion of the gas was about the same in quantity in both cases. After some experiments he arrived at the conclusion, than this was caused by a greater quantity of air finding access to the *interior* of the flame. It is well known that when atmospheric air is thoroughly mixed with a jet of burning gas by means of a cap of wire gauze, that the luminosity is thereby greatly diminished, but the temperature is *elevated*. The latter seems to be one point of difference from the experience of Professor Frankland. In the smelting of iron ore the pressure of air has been increased in many furnaces during recent years, and with a greatly augmented yield of iron in each case. Sir Humphrey Davy in his researches on flame, had noticed a diminution of the light with a decrease of pressure in the atmosphere, but he did not determine the relative amount. The table furnished by Professor Frankland is a valuable contribution to science. It supplies very useful information for increasing the brilliancy of flame.

THE INFLUENCE OF WAR ON INVENTIONS.

The Commissioner of Patents has deemed it expedient, in consequeunce of the lack of business in his department, to discharge a large number of the Examiners and Clerks from the Patent Office, and to greatly reduce the salaries of such as are retained. For instance, the First Examiners are reduced in salary from $2,500 to $1,800 per annum; and other subordinates in a like proportion.

The following figures show the falling off in applicants to be about 50 per cent from last year. For the week ending Sept. 4, 1860, the number of patents granted was 101. By reference to the claims published on another page, it will be perceived that only 54 patents were issued for the week ending the 3d inst.—being but about one-half the number granted in the corresponding period last year. There is no reason, however, why inventors should relax their energies in these times; on the contrary, when the usual avenues for money-making are obstructed, and, in many instances, closed, we think persons out of business will not find a better field for operation than to engage in inventing, if they have the genius; and if they have not, there are plenty of good patents which can be purchased for a moderate sum in these times, on which we believe fortunes may be made by exerting only ordinary business talent.

Men of genius! bestir yourselves, and make an improvement on some well-known machine, if you have not the ingenuity to strike out into some new field of discovery. If you cannot conceive a power to take the place of steam, improve the engine or boiler, or make a better and cheaper sewing machine, cider mill, churn, washing machine, or anything to diminish manual labor in any department of mechanics.

Capitalists, look about you and find an honest inventor who has patented a useful invention, but has not the means to bring it practically before the public, and either buy it or advance him money to work his invention, and thus help on a fellow being; at the same time, you will be likely to receive a larger interest on your money, and find it a safer investment, than buying bonds or stocks in these uncertain times.

All classes of persons, instead of lying idle and waiting for better times, should bestir themselves, renew their activity, and by thus doing, their very acts will hasten the good time anticipated.

GLASS FOR LEYDEN JARS.

A correspondent writing from Rochester, N. Y., informs us that he has experienced great trouble in obtaining proper glass for making Leyden jars by coating them with tin foil. He states that he lately coated six different white glass jars with tin foil, and was unable to charge any one of them with electricity. He also coated two green glass jars, which also failed, but he succeeded in charging one jar of coarse glass of a blue-green color. On making inquiries of the librarian of the Rochester Athenæum—a scientific and practical electrician—he was told it was difficult to obtain glass jars suitable for being charged with electricity, but by covering them with shellac varnish he partly overcame the difficulty.

Our correspondent believes this subject should be brought before the public as many persons may have had the same trouble as himself and no reliable information can be obtained on the subject in books. Glass manufactured with lead in the flux, or with too much soda, will not answer for making Leyden jars. Of course it is impossible to tell what kind of flux has been used it the manufacture by the appearance of the glass.

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NEW ENGINE CONDENSERS.

In the issue of the SCIENTIFIC AMERICAN of Sept. 7th, we related the several changes which are taking place in producing the condensation of exhaust steam and obtaining a vacuum in marine engines, but we scarcely made any allusion to the different kinds of surface condensers in use. The earliest surface condensers that were used admitted the exhaust steam into a great number of small tubes, and the refrigerating water was applied on the outside. The more common mode now adopted is that of exhausting the steam into the condenser on the outside and among the tubes while the cooling water is forced through them.

In the fleet which was lately engaged in the taking of the forts at Hatteras Inlet, the part which the steamer *Monticello* played is thus described by an eye-witness :—

The *Monticello* had proceeded ahead of the land force to protect them, and had reached the Inlet, when a large fort, of an octagon shape, to the rear and right of the small battery, mounting ten 32s and four 8-inch guns, which had till then been silent, opened on her with eight guns at short range. At the same instant she got aground and stuck fast, the enemy pouring in a fire hot and heavy, which the *Monticello* replied to, with shell, sharply. For fifty minutes she held her own, and finally getting off the ground she came out, having been shot through and through by seven 8-inch shells, one going below the water line. She fired 55 shells in fifty minutes, and partially silenced the battery. She withdrew at dusk for repairs, with one or two men slightly bruised but none killed or wounded The escape of the vessel and crew was miraculous.

In reading this description we are reminded of the peculiar condenser with which the *Monticello* is furnished. It is called "Eunson's Decalorator," and is a combined inside and surface condenser. The steam is exhausted into a common inside condenser, when it is met directly by a shower of cold fresh water, but this same fresh water is used over and over again for condensation and feeding the boilers. This is effected by conveying the hot condensed water through tubes which are exposed to refrigeration by cold salt water made to flow around their exterior. After being cooled to a lower temperature it is brought back by a tube and showered direct into the inside of the condenser among the exhaust steam.

This condenser has been very successful in the *Monticello*, which is a powerful screw steamer, now converted into a gun boat, but was formerly one of Cromwell's line, plying between New York and Baltimore. The steamer *Vanderbilt* has also been fitted lately with one of these decalorators, and able engineers have spoken to us in the most flattering terms respecting their good qualities.

THE ARMSTRONG GUN AND ANGULATED IRON PLATES.

Several experiments have lately been made at Portsmouth, England, with iron plates secured as a target to the side of an old vessel called the *Griper*, and one of the large Armstrong rifled cannon. The iron plates were four in number, two 4½ inches and two 5½ inches thick made at Parkgate, Yorkshire. Their edges were laid square without being tongued and groved like the plates of the *Warrior*, and they faced the gun at an angle of about 50°. They were backed upon 12 inches thick of pine, which was bolted to iron plating of ⅝ inch thick. The Armstrong gun was placed on another vessel at 200 yards distant, and firing commenced with a bolt of cast-iron 12 inches long, seven in diameter, and weighing 110 lbs. ; the charge of powder was 14 lbs. Twenty-two shots were fired, most of them striking, and upon an examination of the target it was found that six had struck within a space of 12 by 21 inches, and three of these were within two inches of the same spot and close to the edge of the 4½-inch plate. This tremendous hammering of these bolts drove the plate 3½ inches into the pine backing and fractured it at right angles, but in no instance was the target penetrated. The inner shell or iron plate of the target was uninjured. It would therefore appear that iron plates can be made and hung to resist the most powerful shot.

GLASS CUT BY LIGHTNING.—A thunder storm which recently broke over Paris occasioned a curious accident. A large glass bottle containing cherry brandy, in a house in the Faubourg St. Martin, was cut by the lightning in a line as straight as if it were done by a professional hand. The neck of the bottle was struck off and driven through a window into the garden, a distance of more than thirty yards.

PATENTS GRANTED FOR LUBRICATING COMPOUNDS.

The following is a complete abstract of the American patents, which have been granted for lubricating compounds up to the present time. The information is of great importance and value. The expense incurred annually for lubricating the vast amount of machinery in our country is enormous. Every joint, spindle, journal, piston, and frictional surface in every machine must be frequently supplied with some unctuous substance. On some of our railroads, and in some single factories, the expense for oil and tallow amounts to many thousands of dollars every year. All persons who employ machinery to any extent have, for a long period, been fully impressed with the benefits which would accrue to them by the invention of a good and cheap substitute for such expensive lubricators as lard and sperm oil. What our inventors have done in this department is indicated by the accompanying record of patents for lubricators :—

INDEX OF LUBRICATING PATENTS.

Luber, Hancock and Delevan, in their patent dated Sept. 11, 1847, describe a mixture of water, sal-soda, and gum tragacanth.

Kirk and Dodsworth, in their patent, dated Oct. 16, 1847, describe a mixture of whale oil, or other oleaginous substance, asphaltum and coal tar combined together by exposure to a high temperature in a suitable vessel.

P. S. Devlan in his patent, dated Jan. 16, 1849, describes, caoutchouc dissolved in turpentine or other solvent, carbonate of soda, glue, animal or vegetable oil, or cheap fatty matter and water. They may be mixed in various proportions. The following answers very well :—1 pound dissolved india-rubber, 4 pounds carbonate of soda, 1 pound of glue, 24 gallons of common oil or grease, 8 gallons of water.

A. S. Greenville in his patent, dated Jan. 30, 1849, describes the following mixture :—15 gallons of lard oil, 60 of sperm, 14 of cod liver ; 4 ounces of carbonate of soda for each gallon, and if not thick enough add 2½ drachms of French chalk. These proportions answer, but the patentee does not confine himself to them.

I. & W. M. Cumberland in their patent, dated April 3, 1849, give the following mixture :—Take potash and dissolve it to make a lye of 12° Baume in strength and add one-third of lime compared to the quantity of potash. This is boiled for 15 minutes, when the insoluble matter is allowed to subside. The clear liquid is now run off, and boiled until it indicates 15° Baume in strength. To this is now added 24 gallons of whale or crude oil, heated to 150° Fah., and the whole raised to 212° Fah. stirred, 6 gallons of water added, and the temperature raised to near the boiling point, when the mixture is complete.

J. Selgarth in his patent, dated June 24, 1851, sets forth the following :—3 pounds of tallow, 2 pounds of rosin, half a pint of spirits of turpentine mixed together under heat ; but not confined to these proportions ; oil may be substituted for the tallow.

W. W. Mason in his patent of May 25, 1854, gives :—Linseed and rosin oil in the proportions of 9 to 7 gallons with 12 pennyweights of gum camphor to each gallon.

Mr. Little's patent of August 1, 1854, sets forth a mixture of coal oil and heavy oily products of the second distillation of bituminous coal, with saponified vegetable, or animal oil or fat, mixed after or during saponification.

Reuben R. Brown's patent of Jan. 18, 1859, sets forth : 3 quarts of weak alkaline lye, a quarter of a pound of common bar soap, 2 grains of saltpetre, all mixed together ; then take 1 ounce of sulphur, 1 quart of common fish oil, and grind the sulphur in the oil ; mix all together.

Horace Vaughan and W. Hutton in their patent of August 2, 1859, gives the following mixture :—Take a 40 gallon cask and put about 40 pounds of lime in it ; pour in soft water until the lime is nearly slacked, then add 1 pound of sulphur and half a pound of soap-stone, or 1½ pounds of sulphur without the soap-stone.

J. B. McMunn in his patent of Jan. 3, 1860, sets forth the following mixture :—1 gallon of whale oil highly heated, 5½ ounces of beeswax, stir until they are melted together ; then take 1 gallon of the solution of carbonate of soda, made by dissolving 7 ounces of carbonate in a gallon of soft water ; heat to 200° Fah., and mix all thoroughly together.

Radspinner & Moss in their patent, dated July 3d, 1860, gives the following :—30 pounds of caustic lime, 15 ounces of calcined magnesia, 15 ounces of pulverized soap-stone, 15 ounces of chloride of lime, and 1 gallon of alcohol, to which are added a sufficient quantity of water and oil.

C. L. Morehouse in his patent, dated Jan. 29, 1861, sets forth the following mixture :—2 quarts of soft soap and 1 pound of flour of sulphur, all stirred together in a vessel of one and a half gallon capacity, 2 ounces of lamp-black, 1 ounce of pulverized charcoal, 2 pounds of fat salt pork chopped fine, a quarter of a pound of cotton finely separated, 1 pound of fine common salt, 1 pint of lard oil (or half a pint), half a pint of coal oil ; mix all thoroughly together.

W. Turner in his patent of Feb. 19, 1861, sets forth the following compound to make 6 gallons : 1 pound of chloride of lime, 1 ounce of carbonate of soda, 3 gallons of soft boiling water, 3 gallons of lard, elephant, or sperm oil. Dissolve the carbonate of soda in the water, then add the oil and the chloride of lime, and stir the whole together.

A. Lebkucher in his patent, dated June 25, 1861, gives the following recipe :—Dissolve a quantity of zinc in muriatic acid of ordinary temperature using sufficient zinc to saturate the acid ; then add 1 pound of the muriate of zinc to 100 pounds of rosin oil, and raise the heat slowly to 165° Fah. The oil now becomes clear and free from impurities. Forty gallons of this oil are now mixed with 20 pounds of slacked lime in fine powder, and the temperature is raised in a kettle to 190° Fah., and maintained thus for half an hour, when it is drawn off and permitted to cool. To this are now added 1 gallon of olive oil, and 2 gallons of soft water, and the whole stirred until it becomes a whitish mass, when it is finished.

S. W. Mott in his patent, dated July 23, 1861, gives the following :—1 gallon of crude mineral oil, 2 gallons of soft water, 2 ounces of common salt, a quarter of an ounce of saltpetre, 1 ounce of unslacked lime, a quarter of a pound of common bar soap. These are subjected to the action of steam, and become when thoroughly mixed a lubricating material.

Manufacturing Operations.

Two mills of Slater & Sons, of Webster, Mass., which had been stopped for several weeks, have resumed operations.

The cotton factory at Newburgh, N. Y., which had been stopped for several weeks during the summer, has also resumed operations.

The Sturbridge (Mass.) Cotton Mills, which had suspended operations some weeks since, commenced again on the 3d inst., with a supply of cotton sufficient to keep them running until next spring.

The Taunton (Mass.) *Gazette* says:—"The Whittenton Mills and the tack factory of Lovett Morse will resume operations on Monday next. The former establishment has been inactive for about two months, during which time alterations and repairs have been made."

There are seventy mills in New England now engaged in the manufacture of various kinds of cloth for the government, for army supplies. The amount of goods ordered is estimated at $20,000,000 in value.

The several woolen mills at Dover, N. H., are running at full speed making army cloth. The mills of Messrs. Sawyer, in this place, have a large contract for making the cloth of the regimental caps for the State militia.

The woolen steam mills at Utica, N. Y., are running almost day and night in manufacturing cloth of the regular army quality.

General McClellan on the Sabbath.

The following order respecting the observance of the Sabbath in our army has just been promulgated by Major-General McClellan. It reminds one of the days of Oliver Cromwell:—

HEADQUARTERS, ARMY OF THE POTOMAC,
WASHINGTON, Sept. 6, 1861.
GENERAL ORDER, No. 7.

The Major-General Commanding desires and requests that in future there may be a more perfect respect for the Sabbath on the part of his command.

We are fighting in a holy cause, and should endeavor to deserve the benign favor of the Creator.

Unless in the case of an attack by the enemy, or some other extreme military necessity, it is commended to commanding officers that all work shall be suspended on the Sabbath ; that no unnecessary movements shall be made on that day ; that the men shall, as far as possible, be permitted to rest from their labors ; that they shall attend divine service after the customary Sunday morning inspection, and that officers and men alike use their influence to insure the utmost decorum and quiet on that day. The General Commanding regards this as no idle form ; one day's rest in seven is necessary for man and animals ; more than this, the observance of the holy day of the God of Mercy and of Battles is our sacred duty.

GEORGE B. MCCLELLAN,
Major-General Commanding.

Official: S. Williams, Assistant Adjutant-General.

Exports of Breadstuffs.

The New York *Shipping and Commercial List* publishes the following table of breadstuffs exported from the United States to Great Britain since Sept. 1, 1860 :—

	Flour. Barrels.	*Meal. Barrels.*	*Wheat. Bushels.*	*Corn. Bushels.*
New York	1,752,802	2,913	20,253,868	8,236,921
New Orleans	183,071	400	88,151	1,784,012
Philadelphia	184,225	—	1,536,821	674,323
Baltimore	128,131	12	1,000,249	850,196
Boston	124,658	106	18,413	14,100
Other ports	160,844	—	2,369,988	15,451
Total, 1860-61	2,533,731	3,431	25,267,500	11,574,103
Total, 1859-60	684,723	944	4,685,123	2,224,682
Increase	1,849,008	2,487	20,582,377	9,239,421

A NEW species of rye, indigenous to California, and remarkable for the largeness, plumpness, and beauty of its grain, has been exhibited in Washington. Mr. Isaac Newton, the newly appointed Superintendent of the Agricultural Bureau, connected with the Department of the Interior, has received a small supply of the grain, and will distribute it among the farmers in different parts of the country. Its yield is said to be very great, reaching even, on poor land, fifty bushels to the acre.

CANAL TOLLS.—The amount of tolls received from the opening of navigation to and including the fourth week of August, 1860, was $1,563,896.42 ; and the amount of toll received from the opening of navigation to and including the fourth week of August, 1861, was $1,921,137.21—an increase of $357,240.70.

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The Atmosphere.

Our atmosphere extends to a hight of some forty-five miles from the surface of the earth, but such is the varying density of the air that when you have risen to the hight of three miles in the atmosphere, you have then about one-half of the total weight of the air below you. Although we generally regard the air as an exceedingly light material, still its absolute weight is far from inconsiderable. It is 815 times lighter than water, and more than 11,000 times lighter than mercury. Still, if you canceive a column of atmospheric air extending from this table upward to the extreme limits of the atmosphere, and measure only an inch square, that column of air weighs fifteen pounds. A moderate-sized room contains sufficient air to crush a man to death if it could be collected together and placed upon him.

The composition of the atmosphere has for many years engaged the attention of chemists. The first experiments that were made upon the composition of air after it had been ascertained that it consisted chiefly of two gases, namely, nitrogen and oxygen, led to the inference that its components were liable to very considerable variations. It was found that sometimes there was 18 per cent of oxygen, at other times 19 per cent, at other times 20, and at another time 24 or 25 per cent of oxygen; and it was imagined that the salubrity or otherwise of any district depended upon the amount of oxygen contained in the air of that district. But those apparent differences in the composition of the atmosphere were due entirely to the defects of the modes of experiment at that time. The modes of estimating the quantity of nitrogen in the air were so defective as to give rise to errors. When this process of analysis became further perfected, the opposite error was fallen into for a short time, and the indications of this more perfect method showed a complete uniformity in the composition of atmospheric air. Specimens of air taken from crowded cities, from the country and from great hights, were all perfectly uniform in composition. As the methods of analysis still further improved, the incorrectness of this conclusion was also discovered, and it was found that there are variations in the atmosphere—variations, it is true, within very small limits, indeed, but still far within the reach of experiment to detect.

100 volumes of the atmosphere contain :

Oxygen	20.61	volumes
Nitrogen	77.95	"
Carbonic acid	.04	"
Aqueous vapor	1.40	"
Nitric acid, ammonia and fire-damp	Traces	
	100.00	

The Cinnamon Crop in Ceylon.

The cinnamon gardens in the neighborhood of Colombo, impart to the whole scene a singularly cheerful, agreeable aspect. The bushes, from four to six feet in hight, with their smooth, beautiful, light green leaves, and their pale, yellow flower-stamens shoot up fresh and succulent, from the snow-white quartz soil in which they best thrive. The flower season of the cinnamon is in January, and the fruit ripens in April, when the sap is richest in the shrub. In May the boughs are begun to be "barked," which process continues till October. The pruning and gathering of the yearling shoots, which are about the thickness of a man's thumb, is very laborious, and employs many hands. Each laborer cuts off as many as he can conveniently carry in a bundle, then, with the point of a crooked knife, made for the express purpose, strips the entire rind from the wood, carefully scrapes off the exterior cortical and innermost layer, and lays the stripped off cinnamon rind, now reduced to the thickness of parchment, in the sun, where it dries and curls together.

All round the hut, in which the peeling of the rind is carried on, is diffused a most exquisite aroma, caused by the breaking of the leaves or twigs. What is related, however, by travelers of the fragance of cinnamon forests, which they have scented at a great distance seaward, would seem to indicate that this delicious odor emanates from various other aromatic plants in which Ceylon is so rich, rather than the cinnamon groves, the aroma of which, indeed, is not perceptible beyond the immediate vicinity. The best description of cinnamon is not so thick as stout paper; and is fine grained, flexible, light brown or golden yellow, sweet and pungent; the coarser qualities are thick-skinned, dark brown, acrid, stinging, and leave a bitter after taste. In the warehouses the cinnamon rinds and canes sorted for shipping are piled upon each other, and packed in bales of about 90 lbs. weight each, and carefully sewed. In all cavities and spaces between each layer an immense quantity of pepper is strewn, to preserve the cinnamon during its sea-voyage, by which both spices are benefited, the black pepper absorbing all the superfluous moisture, and gaining by the fragrance of the cinnamon.

Treating Sugar Cane and Beet Root Juice.

The French papers describe, in glowing terms, a discovery in sugar making lately brought before the Parisians by M. Rosseau. The saccahrine juice, when first extracted from plants is colorless, but it has such an affinity for oxygen after leaving the cells of the plant that it very soon becomes dark in color and changed in character by exposure to the atmosphere. To prevent this chemical action—principally due to the albumine of the juice—the sulphate of lime, sulphur and various substances have been used. Rosseau's process consists in removing the albumine in the juice by mixing a very small quantity of sulphate of lime with the juice immediately when extracted, heating it up to 212° in a boiler, when the albumine rises to the surface and is skimmed off. About eight per cent of hydrated protoxyde of iron is now stirred in, and this, it is said, neutralizes all the changeable part of the juice and leaves it colorless. The juice is now simply evaporated to obtain beautiful crystals, without the usual tedious and expensive operations of filtration through animal charcoal, &c.

THE CANADA THISTLE.—The Canada thistle, execrable, and forever to be detested! hateful to sight or touch, did not come from Canada, but Europe. It has a malignant vitality. Its roots creep under ground, and its seeds multiply and fly endlessly above ground. The vexed farmer has to fight them as one does guerillas, one by one. Linnæus pronounced it the greatest pest of the earth, in Sweden. Dr. Darlington, in his history of weeds, has given to this species the name, *cursed thistle*. Few botanical terms will be pronounced more heartily. This is the very thistle that came up to punish our first parents. It carries judgment and punishment with it, both to man and beast. To have these thistles on a farm, without effort at extirpation, ought to be as disgraceful as to have vermin on the body. Now is the time to cut them down wherever they appear—in fields and by the roadside. Never allow them to come to seed as they fly upon "the win gs of the wind."

A NEW VEGETABLE.—There has lately been exhibited, at severel meetings of the Royal Horticultural Society, a new vegetable, which promises to become a permanent institution among kitchen garden crops. It is a cabbage in the form of Brussels sprouts. The stem is about a foot high, bearing on its summit a good-size hearted cabbage, of the ordinary character; but the stem is covered with small cabbages about the size of a small dessert apple, and these, when cooked, form an excellent dish, partaking of the flavor of a nice summer cabbage, and without the strong Savoy flavor which distinguishes the Brussels sprouts.

To the camp at Chalons the Emperor has added a series of military gardens, cultivated by the soldiers. Vegetables are raised in enormous quantities, and there is quite a rivalry among the regiments to see which can produce the greatest quantities of the best kinds.

ANOTHER NEW ALKALI METAL.—Whilst investigating the new metal *cœsium*, Bunsen has lately discovered another metal, which seems to resemble potassium as closely as cœsium does. It has a high atomic weight, its hydrate is deliquescent and highly caustic, its carbonate is strongly alkaline, and its nitrate anhydrous like nitrate of potassa, but, unlike that salt, its crystalline form is hexagonal. It was obtained from *lepidolite*.

THERE is a coal mine in Cheshire, England, which is 2,504 feet deep. There is a copper mine in Cornwall 2,180 feet deep. Engines of several hundred horse-power are required to lift the minerals and pump such mines.

The Cast Iron Plow—Great Plow Manufacturer—Success of Inventors.

In the search for competency and fortune, inventors have greater inducements and more encouragement to make improvements in mechanism, than merchants, lawyers, politicians, or authors have to plan and struggle in their several walks of life. Thus many of the princely fortunes and great manufacturing establishments in every part of the world have had their origin in patented inventions. The richest plebians in England are the descendants of Richard Arkwright, the inventor of the throstle spinning frame; and the greatest engineering works in Great Britain—those of Bolton & Watt, of Birmingham—were founded on the invention of the steam engine. Colt's immense manufactory of firearms at Hartford, Conn., originated in the patented revolving pistol, and the extensive sewing machine manufactories of Wheeler & Wilson and Grover & Baker, the fire-proof safes manufactured by Herring, the hats by Burr, the printing presses by Hoe & Co., the extensive india rubber manufactures of various kinds of goods, were all founded upon patented inventions. We could instance several other similar cases, but the following from the London *Ironmonger* is, perhaps, one of the most conspicuous which could be produced :—

Fifty years ago the only implements in common use for the tillage of the soil were the plow, the harrow and the roller. These were of most primitive construction, and had few features in common with the modern implements bearing the same name. In the barn the flail still maintained its place; winnowing machines were here and there to be seen; but the thrashing machine, the drill, the scarifier, now to be found upon every well cultivated farm, though not absolutely unknown, were regarded generally as objects of curiosity rather than of use.

It was about the year 1783, when farming was in much the same condition as it had been from time immemorial, and when the state of the country and the habits of the farmer forbade rapid means of communication between the inhabitants of one district and those of another, that Robert Ransome, then living at Yarmouth, commenced devoting his mechanical ability to the improvement of plows. The first part of this implement which claimed his attention was the plow-share. Up to that period it had been made in wrought iron; for no method having been discovered of making cast iron sufficiently hard to endure the work, there was no other alternative to the farmer but to use a material which, if not harder, at least admitted of frequent sharpening by the blacksmith. It was in the year 1785, up to which period there had only been seven patents ever granted by the English government for the manufacture of plows or their parts, that Robert Ransome took out his first patent for a method of tempering cast iron plow-shares; and this was followed by a succession of improvements, until, in the year 1803, he patented the process by which plow-shares in cast iron are produced with the under side as hardened steel, and the upper side of the original softness of the iron. This plow-share, in spite of the difficulties of transit, became rapidly diffused throughout the eastern counties of England, and subsequently spread over the whole island, superseding, on account of its cheapness and advantage to the farmer, the old wrought iron share. We have dwelt rather at length upon this patent, because its original success was the foundation of the subsequent business now carried on at the Orwell Works, Ipswich, which has increased until the factory covers nearly thirteen acres of ground with its workshops and yards, and gives continuous employment to upward of 1,100 men and boys, of whom more than 400 are engaged in the manufacture of plows only. In the year 1808, Robert Ransome took out a third patent for the wheel plow; the leading feature of which was, that the working parts were easily removable and renewable by the plowman in the field without requiring the intervention of the blacksmith. Plows made on this patent, and each possessing such peculiar modifications as the customs and usages of different localities demanded, rapidly spread throughout the kingdom; and in the year 1839, at the first meeting of the Royal Agricultural Society at Oxford, although no provision had been made in the early constitution of the Society for promoting the implement manufactures of the kingdom, and no inducement in the shape of medals or prizes was offered, "the Ransomes," to use the words recorded in the Society's Journal, "sent up their wagons laden with more than six tuns of machinery and implements, the superior manufacture and the variety of which commanded universal approbation, and amongst which were a variety of plows of superior construction.

THE LOUDEST NOISE THAT EVER WAS HEARD.—Prof. E. W. Evans of Marietta College, Ohio, gives, in the last number of *Silliman's Journal*, an elaborate account of the great meteor which passed over Ohio on the 1st of May, 1860. He says that the *explosion was heard over an area of about* 150 *miles in diameter.*

A. DELAPORTE, of Paris, proposes to unite the joints of water pipes by means of a free collar which shall slide along the tubes, and which, after being brought over the abutting ends of the two pipes, will leave a space all around which is to be filled up with cement poured in through an aperture in the collar.

THERE are eight thousand laborers now engaged upon the Suez canal in Egypt. It is intended that steam communication will be established by it between the Mediterranean and the Red Sea.

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ISSUED FROM THE UNITED STATES PATENT OFFICE
FOR THE WEEK ENDING SEPTEMBER 3, 1861.
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PATENTEES, READ THIS.

The new Patent Laws which went into force on the 2d of March last, authorized the Commissioner of Patents to have all the specifications which form part of the Letters Patent printed.

This is a wise provision, and it renders the documents much handsomer than the old system of engrossing them on parchment; besides, in passing before the printer and proof-reader, the clerical errors, which were often made by the copyist, are mostly obviated, thus rendering the patent more likely to be correct.

But, to enable the printer and proof-reader an opportunity to do their work properly, the Patent Office is obliged to withhold the Letters Patent after granting them, for about *three weeks* after the claims are published in the SCIENTIFIC AMERICAN.

This explanation is intended to answer scores of letters received from patentees at this office every week, inquiring why they do not get their documents. We trust it will also save the Patent Office the trouble of writing to every patentee to explain the cause of their not receiving their patents the moment they see their claims published in these columns.

MUNN & Co.

*** Pamphlets giving full particulars of the mode of applying for patents, under the new law which went into force March 4, 1861, specifying size of model required, and much other information useful to inventors, may be had gratis by addressing MUNN & CO., Publishers of the SCIENTIFIC AMERICAN, New York.

2,173.—Levi A. Beardsley, of South Edmeston, N. Y., for an Improvement in Hop Frames.

I claim the employment of permanently fixed horizontal wires, in combination with detachable horizontal sustaining wires supported by the permanent wires, and arranged substantially in the manner set forth for the purposes specified.

I also claim, the combination of two parallel sustaining wires, the one above the other, with the connecting tie poles, l, and the keying clamps, m, substantially as and for the purpose set forth.

I also claim, the keying clamp, m, constructed substantially as above described, in combination with the training cords, for the purpose set forth.

[This invention relates to a novel method of securing short poles or sticks to the two horizontal wires which form the main part of the hop frame whereby said sticks will form braces for sustaining the main wires at intermediate points between the posts on which the wires are hung; and said sticks may be readily removed from the main wires and replaced at pleasure in the training of the wires and the gathering of the hops as will be described.]

2,174.—Benjamin S. Benson, of Baltimore, Md., for a Machine for Moulding Pipes:

I claim, first, The hopper in combination with the flask holder, and moving with it in the manner described.

Second, In combination with a pipe moulding machine, the reed, R, constructed substantially as described, and for the purpose specified.

Third, The combination of the pump plunger with the hopper, so that water will only be discharged while the hopper and flask are descending together, as set forth.

Fourth, The combination of the cone, I, and fingers, J, with the hopper, H, substantially in the manner and for the purpose specified.

Fifth, Packing the flask as it is moving downwards, as described.

2,175.—William Betto, of Wharf Road, City Road, England, for Metallic Capsules. Patented in England, Jan. 13, 1849:

I claim the new manufacture of capsules and of a material to be employed therein (as described), and for other purposes as stated, that new material being laminated plates, sheets or leaves of lead, covered with tin on the surface or surfaces of one or both sides of such laminated plates, sheets or leaves; the application of the tin to the lead being performed in the manner described, and the adhesion of one metal to the other being obtained by the agency of the same mechanical pressure whereby the lamination of the new material is performed in the manner described.

2,176.—Wm. H. Bigelow, of South Framingham, Mass., for an Improvement in Melodeons:

I claim, first, The employment, in combination with any number of the playing keys of a melodeon or other instrument having reeds and keys of similar character, of a series of hooks, G G, or other catches or stops, operating substantially as described, to lock the keys after the depression and produce the effect set forth.

Second, The employment, in combination with the series of hooks, G G, of a sliding stop-bar, operating substantially as and for the purposes specified.

Third, The transmitting of the movements of the keys to the reed valves by means of levers, b b, working through the air chest on air-tight fulcra, substantially as specified.

Fourth, The combination of the pedal, P, the spring, u, and the board or bar, s, the whole applied to operate substantially as described in combination with the receiving chamber, E, of the bellows for the purpose set forth.

2,177.—Jacob Bradley, of St. Mary's, Ohio, for an Improvement in Steam Engines:

I claim, first, The hollow valve, E, with its port, d, and cavities, e e', fitted to a seat having ports, a b b' c c', and combined with the steam pipe, H, exhaust pipe, I, and the two cylinders, A G, substantially as specified.

Second, Connecting the two ends of the smaller cylinder, A, by means of a pipe, k, and stop-cock or stop-valve, l, substantially as and for the purpose specified.

2,178.—Jehu Brainerd, of Cleveland, Ohio, for an Improvement in Tanning.

I claim the immersion of skins, prepared as set forth in a decoction of salix grisea, as and for the purpose specified.

2,179.—Edward Buckman, of East Greenbush, N. Y., for an Improvement in Horse Rakes:

I claim the arrangement of the springs, G, and pivoted bar, H, with the independent pivoted teeth, F, arms, E, lever, J, hinged bar, D, and foot lever, L, as shown and described.

[This invention relates to that class of horse hay rakes which are provided with independent teeth. That is to say, teeth which are allowed to work or yield independently of each other, and all placed under the complete control of the driver or attendant, so that they may all be elevated simultaneously when required for the purpose of transportation.]

2,180.—C. Christensen, of Brooklyn, N. Y., for an Improvement in Rotary Engines:

I claim, first, The arrangement of the dogs, G G, with square notches, k k', in combination with the tooth, i, bell crank levers, l. m l' m', arm, o o', toothed segments, h h', and abutment, E, all constructed and operating as and for the purpose set forth.

Second, The arrangement of the cam, H, and cut-off valve, I, in combination with the rising and falling abutment, E, as and for the purpose described.

Third, the employment of the conical packing rings, q, and inclined faces, r, on the piston wheel, A, in combination with the conical projections, s, on the inner sides of the disks, J, constructed and operating in the manner and for the purpose specified.

Fourth, The arrangement of the angular packing pieces, b2, hinged pins, e2, and springs, f2, in combination with the rectangular packing pieces, a2, pins, d2, and and springs, c2, on the sides of the abutment, E, as and for the purpose described.

Fifth, The arrangement of the locking spring bar, h2, and lugs, l2, in combination with the self-adjusting spring piston, D, constructed and operating in the manner and for the purpose specified.

Sixth, The employment of the stationary pointer, L, in combination with groove or mark m2, on the rotary central shaft, C, as and for the purpose set forth.

Seventh, The arrangement of the conical journal boxes, N, in combination with the tapering journals of the rotary shaft, C, constructed and operating as and for the purpose described.

[The nature of this invention is explained by the claim as well as can be without drawings.]

2,181.—Levin P. Black, of Baltimore, Md., for an Improvement in Hydrants:

I claim the combination, in a hydrant or pump, of an earthenware plunger having a vitreous surface with an india rubber or other similar packing, prepared and arranged substantially in the manner and for the purpose before described.

2,182.—D. M. Cochran, of Richmond, Ind., for an Improvement in the Mode of Measuring and Sacking Grain:

I claim the combination of the elevator, J, screw-conveyer, H, and grain receiver, K, the latter being provided with the slide, L, and valve, M', which valve is connected through the medium of a lever, O, and pawl, P, with a ratchet or register, Q, all arranged for joint operation as and for the purpose set forth.

I further claim the supplemental box, E, connected to the box, B, by joints or hinges, b, and arranged as shown to admit, when not required for use, of being folded down underneath the box, B, as set forth.

[This invention is designed, first, to save labor so far as regards the measuring and sacking of grain, and second, to render the device more portable than those hitherto used, the box which contains the conveyor being capable of being folded when not in use.]

2,183.—John Dickinson, of Brooklyn, N. Y., for a Diamond Protector for Dressing Millstones:

I claim the use of the stem, B, made as described, in combination with the protector stock, A, and pressure spring, F, made and operating for the purposes and substantially in the manner set forth.

2,184.—John Dickinson, of Brooklyn, N. Y., for an Improvement in Mounting Glaziers' Diamonds:

I claim the making of glaziers' diamonds in the form of a pocket knife, substantially as described, as a new article of manufacture.

2,185.—David Dougal and Wm. Truxal, of Butler, Pa., for an Improvement in Beehives:

I claim attaching to beehives a vestibule or entrance provided with guards, D D, and a sloping bottom, A, constructed and arranged as described, for the purpose set forth.

2,186.—Lucian Fay, of Cincinnati, Ohio, for an Improved Edging Machine:

I claim, first, The double series of traveling and setting up rollers, C C' C'' E' E'' C C' C'' E E' E'', for the simultaneous setting up of two opposite edges of a metallic plate, in the manner substantially as set forth.

Second, The described combination of traveling and setting up rollers, C and E C' and E', &c., the axle, D, of the setting up roller being secured and adjusted upon the axle, A A', &c., of the traveling roller in the manner set forth.

Third, The notched gages, F F, preceding the flanging rollers, C E C E, and adapted to guide the machine along the tin and to conduct the edges of the latter between the flanging rollers, in the manner and for the objects stated.

Fourth, Forming each axle, A, &c., in two sections, secured and adjusted to each other in the manner and for the objects stated.

2,187.—Isaac Freligh, of Bardstown, Ky., for an Improvement in Machines for Dressing Stone:

I claim, first, The combination of the feathered shaft, T, cam wheel, W, rockshaft, V, arms, q r rack, t', flanged gear wheel, t, and screw-shaft, F, operating in the manner explained, to impart an intermittent motion to the carriage, E, of an automatic stone-dressing machine.

Second, The rag wheels, J K, shafts, J' K', and springs, L L', operating in conjunction to adjust the pick and regulate its stroke, as explained.

2,188.—G. B. Gurley and O. G. Brady, of New York City, for an Improved Cot, Lounge and Chair:

The frames, A A' A'', formed of parallel bars, a a, with canvas, C, attached, and connected by hinges or joints, B, in connection with the stationary legs, D, and removable legs, E E', connected by bars, F, and braced by hooks, F', all being combined and arranged to form a new and useful combination of a cot, lounge and chair, substantially as set forth.

[The object of this invention is to combine a cot, lounge and chair in such a way that the device may be used in any one of the capacities named, and serve equally as well as if made separately for any one of them, and be capable of being folded up very compactly for transportation, when required.]

2,189.—Robert Hale, of Roxbury, Mass., for a Pipe Coupling:

I claim the described coupling, C, for conducting pipes, the coupling fitting closely to the pipe at its ends, and having a hole, i, through which cement or other packing is introduced into the space, f, as set forth.

2,190.—Peter Harder, of Danville, Pa, for an Improvement in Cements for Roofing Purposes:

I claim the described roofing composition, made of naphtha, shellac, alcohol, rubber, flax seed oil, asphaltum and soapstone, in the proportions and manner set forth.

[The object of this invention is to produce a roofing compound of such elasticity and power as to resist expansion and contraction that it will not be liable to crack when exposed to the influence of the varying temperature.]

2,191.—D. A. Haviland, of Fort Dodge, Iowa, for an Improvement in Boot Legs:

I claim, as a new article of manufacture, a high boot provided on each side with a steel spring secured on the outside of the seam in an outwardly projecting welt, all as shown and explained.

2,192.—G. D. Haworth, of Decatur, Ill., for an Improvement in Corn Planters:

I claim the combination and arrangement, as shown and described, of the frame, C, with the bars and levers, f f, driver's seat, F, and the adjustable, bar, E, for the purpose specified.

[This invention consists in a novel and improved way of adjusting and graduating the depth or penetration of the furrow shares in the earth, whereby the driver may have complete control over said shares and readily adjust the same at any given depth in the earth, according to the depth the seed is required to be planted, and also readily elevate the shares above the surface of the ground when required, as in moving or transporting the device from place to place.]

2,193.—J. A. C. and A. S. Hickman, of Summerfield, Ill., for an Improvement in Corn Planters:

We claim the combination and arrangement of the gearing, E' F, cranks, H H, rods, I I, tappets, m m, and levers, J J and T T, as shown and described, for operating the reciprocating seed slides, K K, and coverers, R R, from the axle, B'.

[This invention consists in an improved arrangement of furrow and covering shares, whereby the furrow shares may be readily raised by the driver when not required to operate—as turning at the ends of rows, for instance—and the corn covered automatically, the covering shares being operated from the axle of the back wheels of the machine.]

2,194.—James Hughes, of Scranton, Pa., for an Improved Spring Balance for Safety Valves of Locomotives and other Engines:

I claim the combination of the spring, C, screw, H, bar, E, and lever or levers, F F, the whole applied, arranged and operating substantially as and for the purpose specified.

And I also claim the described combination of the pressure-regulating screw, H, lever, I, index, e, graduated plate, f, and stop, i.

2,195.—Stephen Inman, of Rockford, Ill., for an Improvement in Gages for Clapboards:

I claim the piece, G, when connected with a siding hook, in the manner and for the purpose specified, in combination with the gage, M, constructed, arranged and operating in the manner and for the purpose set forth.

2,196.—Wm. Jeffers, of Pawtucket, R. I., for an Improvement in Hose Nozzles:

I claim the swiveled head, C, provided with separate necks, c and c', and adapted in the manner explained to exclude water from either neck at which it is desired to apply or detach a tip.

2,197.—R. Keese, D. T. Ward and J. G. Wilkinson, of Cardington, Ohio, for an Improvement in Flood Gates:

We claim the employment of the gate, C, when operated as set forth, through the medium of the cord, a, weight, c, float, d, connecting rod, e, and latch, D, for the purpose specified.

2,198.—R. J. Mann., of Seneca Falls, N. Y., for Improvement in Metallic Sleds:

I claim a semi-tubular sleigh runner, constructed substantially as described.

I also claim a bed frame of a sleigh, consisting of a combination of longitudinal and cross bars of corrugated metal combined together, substantially as described.

I also claim combining the runners of a sleigh with the bed frame thereof by semi-tubular braces constructed and arranged substantially as described.

I also claim the combination of semi-tubular sleigh runners, a corrugated bed frame, semi-tubular braces, and a bed, the four members of this combination being constructed and combined substantially as described.

2,199.—W. P. Martin, of Salem, Mass., for Improvement in Apparatus for Stirring Tan Vats:

I claim the employment in the vat, A, of the deflecting bars, e, and agitating bars, c, the whole constructed and operating substantially as described for the purpose set forth.

2,200.—W. M. Mason, of Polo, Ill., for Improvement in Corn and Cane Harvesters:

I claim the arrangement of the adjustable reel, I, in an inclined position, to operate in combination with the obliquely-hinged platform, M, tilting lever, N, and spring catch, O, in the manner and for the purpose described.

[This invention relates to a machine for cutting standing corn and cane, and depositing the same in gavels on the ground, and consists in the employment or use of an adjustable inclined reel, in connection with a tilting platform and cutting device, arranged substantially as and for the purpose set forth.]

2,201.—T. J. Mayall, of Roxbury, Mass., for Improvement in Flower Pots:

I claim as a new article of manufacture a flower pot formed of india rubber or gutta percha, substantially in the manner described.

2,202.—Frederick Michael, of Des Moines, Iowa, for Improvement in the Arrangement of Apparatus for the Manufacture of Vinegar by the Quick Process:

I claim the employment of alternate layers of corn cobs, charcoal, and ears of corn in the tub which I use in the described vinegar-making process, the said layers of corn cobs, charcoal and ears of corn, may be arranged in the manner set forth, or in any other that will produce the same effect when a liquor to be acetified is percolated through the said ingredients.

2,203.—Geo. Minor, of Bridgewater, and Burroughs Beach, of West Meriden, Conn., for Improvement in Washing Machines:

I claim the arrangement of the adjustable step, D, with the pivot, C, rollers, F, and tub, B, in the manner shown and described.

[This invention relates to an improvement in that class of clothes-washing machines in which a tub and rubber are made to partially rotate or vibrate, back and forth, or, first in one direction and then in the other, and in opposite directions.]

2,204.—J. B. Morehead and T. A. and G. G. Pool, of Bellefontaine, Ohio, for Improvement in Cultivators:

We claim arranging the shanks, c c, with a square notch, e, in combination with the square key, f, notched piece, g, socket, d, and adjustable handles, B B, arranged in the manner and for the purposes described.

2,205.—John H. Morris, of Niles, Mich., for Improvement in Machine for Holding Bags while being filled:

I claim the sliding or adjustable frame, D, with hopper, F, attached, provided with hooks, c, the frame being fitted between the uprights. B B, and operated by the rack, E, and pinion, H, and retained at the desired point by the ratchet, J, and pawl, K, substantially as and for the purpose set forth.

[The object of this invention is to obtain a simple device for holding bags during the process of filling, whereby the orifices or tops of the bags may be kept distended and provided with a hopper or funnel, and the bags also readily adjusted vertically, so that their lower ends may rest on the platform of the device, and the weight of the bags and their contents supported thereby, so that the tops of the bags will not be torn by the supporting hooks, and the former, when filled, readily detached from the latter.]

2,206.—J. Melvey and C. Ohlemacher, of Aurora, Ill., for Improvement in Railroad Car Brakes:

We claim the swinging frame, D, connected with the hand-lever, K, and provided with the worm wheel, F, ratchet, H, and pulley, G, with the chain, L, of brake-rod, M, attached, in conection with the screw, C, on one of the axles of the truck, and the pawls, b b, attached to bar I, all arranged as and for the purpose set forth.

We also claim the spring, T, applied to the brake rod, M, and arranged substantially as and for the purpose set forth.

[This invention relates to that class of car brakes in which the power

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is applied to the brakes through the medium of the axles of the cars, and consists in the employment or use of a swinging frame, provided with a worm wheel, ratchet and pulley, in connection with a screw on the axle pawls, and rods and levers.]

2,207.—Henry Noblit, of Philadelphia, Pa., for Improvement in Metal Fences :

I claim the metallic button and the recess of railing adjusted to the button, constructed and arranged substantially as set forth for the purposes described.

2,208.—A. W. Olds, of Green Oak, Mich., for Improvement in Rotary Harrows :

I claim the interchangable adjustment of the wheels, F F′, in the sockets, e e′, operating in the manner and for the purpose set forth.

2,209.—Robert Parker, of North Cohocton, N. Y., for an Improved Churn :

I claim the combination of the cranks, the curved links and the operating lever, arranged as described, for the purpose set forth.

2,210.—William Riess, Sen., of Reading, Pa., for the Manufacture of Sheet Iron :

I claim the new and improved process of manufacturing sheet iron, as an entirety, consisting of the following subdivisions :

First, The mixture of equal parts by weight, of chalk, porcelain clay and graphite diluted with water to the consistency of molasses, as described above, substantially in the manner and for the purpose specified.

Secondly, The bath, consisting of one part concentrated sulphuric acid and three parts water, substantially in the manner and for the purpose specified.

Thirdly, The lye, consisting of one part potash diluted with twenty parts of water, substantially in the manner and for the purpose specified.

Fourthly, The method of producing a carburet on the surface of the plates, and of embodying the said carburet with the latter, substantially as and in the manner set forth.

2,211.—Peter Shearer, of Reading, Pa., for Improvement in Air or Gas Engines :

I claim, first, The combination of the reservoir or cooler, A, the power cylinder, C, and its piston, C′, the supplementary cylinder, F, and its piston, F′, and the two heaters, D E, the whole applied in relation to each other, to operate substantially as specified.

Second, The combination with the said reservoir, cylinders and heaters, of the pump, B, applied and operating substantially as set forth.

Third, Combining the piston, F′, of the supplementary cylinder, F, with the main shaft, a, by means of the crank, a4, of longer stroke than the driving crank, and the jointed connecting rod, F3, applied and operating substantially as set forth.

[The principal objects of this invention are, first, to obtain the advantages which, in the use of air as a motive agent, results from subjecting it to a very high degree of compression before expanding it by heat, viz., economy of heat. Second, to obtain the advantages resulting from the use of water as a medium through which the air acts, viz., lubricators of the wearing surface and the prevention of leakage at the valves and other parts of the engine.]

2,212.—William Staehlen, of Brooklyn, N.Y., for Improvement in Bird Cages :

I claim, first, The arrangement of the sockets, a, formed by the edges of the cross bands, A, of bird cages, substantially as and for the purpose described.

Second, The perforated disk, E, in the interior of the seed cup, D, substantially as and for the purpose set forth.

2,213.—Orlando Tallcott, of Chicago, Ill., for an Improvement in Feeding Paper to Printing Presses :

First, I claim the use of friction pads for the purpose of moving the top sheet of a pile of papers forward against front stops, and sideways against side stops, substantially as described.

Second, I claim feeding the sheets between two frames or plates, placed far enough apart to allow a single sheet to pass freely between them, and near enough together to prevent the sheet from doubling up by means of the force applied to bring it to its proper place, when constructed and operated in the manner and for the purpose set forth, substantially as described.

Third, I claim, in combination with the pads, 3 3, the adjustable side stops, 4 4, the same to be adjustable at any required distance from the center.

Fourth, I claim the several devices in combination substantially as set forth and described.

2,214.—Hamilton E. Towle, of Exeter, N. H., for a Machine for Drawing Bolts and Spikes :

I claim, first, the combination with the jaws of bolt-pulling machines, constructed and arranged to operate substantially as described, of grooves which are larger at or near the back part of them than further forward, making substantially dove-tailed grooves ; in which the jaws are positively guided, by having their exterior surfaces fitted to them, so as to slide freely in the grooves and operate substantially as described.

Second, In combination with the jaws of bolt-pulling machines I claim the links, d, having joints at either or both ends, by which the jaws are moved in the dovetailed grooves, substantially as described.

2,215.—James Turner, of Chicago, Ill., for Improvement in Application for Rendering Lard and Tallow :

I claim the combination of the float, c, the sliding pipe, a, and the stationary pipe, i, in the manner described and for the purpose specified.

2,216.—Henry Van Dewater, of Weedsport, N. Y., for Improved Water Wheel :

I claim the two wheels, A A, having their buckets, b, interlocked or geared into each other, in combination with the draught tube, D, substantially as and for the purpose set forth.

I further claim the gate, F, formed of two planes, c c, resting on V-shaped guides, d′ d′, connected by a joint, d, and attached to a windlass, H, all arranged as and for the purpose set forth.

2,217.—Henry Warren, of Goshen, Ind., for an Improvement in Soap :

I claim, as an article of manufacture, a soap made of the ingredients described, in the manner and in the proportions substantially as set forth.

2,218.—Hugh Wihtehill, of Newburgh, N. Y., for an Improvement in Machines for Dressing Yarn :

I claim, first, The arrangement of the reed, C, consisting of a longitudinal central rod, a, and vertical partition rods, c, in combination with spring bars, b, substantially as and for the purpose described.

Second, Regulating the speed of the dressing brush, by imparting rotary motion to it through the agency of the yarn itself, substantially as and for the purpose specified.

Third, The employment of a steam cylinder, O, with a fluted surface, as and for the purpose set forth.

2,219.—James A. Wilcox, of Rocky Hill, Conn., for a Pipe Wrench :

I claim, first, The combination of a hooked or bill-shaped jaw and an adjustable fulcrum, to which the jaw is pivoted, and on which it turns, and the combination with said jaw and fulcrum of the stop or shoulder, i, substantially as described.

Second, I claim a wrench for turning pipes or round bars or rods constructed and operated substantially as above described.

2.220.—Louis Youmans, of Fulton, F. Y., for an Improved Low-Water Detector for Steam Boilers :

I claim the combination of the tube, A, whistle, G, or its equivalent, cock, E, hollow arm, D′ hollow ball, F′, and balance ball, F, arranged and operating in relation to each other substantially as and for the the purpose specified.

2,221.—E. A. Marshall, of New York City, assignor to himself and Thomas Carter, of the same place, for an provement in Tobacco Pipes. Antedated Aug. 10, 1861 :

I claim, as a new article of manufacture, a smoking pipe, made extensible by fitting one portion of the stem so as to slide within the other as and for the purpose specified.

[This invention consists in making a smoking pipe stem in telescopic sections, so that it can be shut up in a small compass and made of a convenient size for carrying about in the pocket.]

2,222.—Rufus Porter, of Melrose, Mass., assignor to himself and H. T. Litchfield, of East Boston, Mass., for an Improvement Apparatus for Elevating Liquids by Retained Power :

I claim the combination of the pump, A, the weight, W, the pinions, I K, the gears, J L, and the discharging pipe, G, when the whole are constructed and made to operate together, substantially in manner as set forth.

I also claim the pump, A, as constructed, and made to operate substantially in manner as specified.

2,223.—H. S. Pratt, of Hartford, Conn., assignor to J. J. Hough & Co., of Meriden, Conn., for an Improved Tinsmith's Shears :

I claim as an improved article of (old) manufacture, viz,, tinsmith's shears, having the back of the inner surfaces of the blades or jaws made diverging or curved, from the line of motion of the working surfaces, substantially in the manner as and for the purpose described.

RE-ISSUE.

121.—J. S. Harbison, of Sacramento, Cal., for an Improvement in Bee-Hives. Patented Jan. 4, 1859 :

I claim, first, The adjustable sectional comb frames, K, constructed and arranged and supported within the hive as described, so that they may be readily removed through the side or door thereof, substantially as set forth.

Second, A separate store honey box in the upper portion of the hive, constructed in sections temporarily connected together in the manner explained and for the purposes specified.

Third, The combination in a bee-hive of the air chamber, B, ventilation passage, m, and curtain, C, substantially as and for the purpose set forth.

DESIGN.

106.—J. G. Thuber and L. Dexter, of Providence, R. I., for Design for Spoons.

107.—Elias Ingraham, of Bristol, Conn., for Design for Clock Case Fronts.

108.—Gilbert Knapp, of Honesdale, Pa., for Design for Cook Stove.

NOTE.—The number of patents issued on the 3d inst., and recorded above, amounts fifty-four. Of this number TWENTY-ONE were solicited through the Scientific American Patent Agency. Persons desiring to secure patents are referred to the advertisement of Munn & Co. on another page.

"WORK" AND "POWER."

If a pound of any matter is raised one foot high, one "foot-pound" of "work" is done ; ten pounds raised a foot, or one pound raised ten feet, measures ten foot-pounds of work ; and ten pounds raised ten feet give the measure of 100 foot-pounds.

Any other mechanical effect produced, as the grinding of a bushel of corn, or the sawing of a thousand feet of boards, is "work," and when it is ascertained how much power is required to produce the effect it may be expressed in foot-pounds ; this being the most convenient measure of work.

It will be observed that work is entirely independent of *time*. If ten pounds are raised ten feet high, whether the operation consumes one second or ten thousand years, in either case 100 foot-pounds of work is done.

"Power" is the force capable of accomplishing any given amount of work in each second, or minute, or day. One horse power is a power which will raise 33,000 lbs. one foot in each minute ; in other words, will perform 33,000 foot-pounds of work per minute.

PATENTS IN THE SOUTHERN CONFEDERACY.

The New York *Tribune* has just published some correspondence emanating from high public functionaries in the Confederate States, which was intercepted by the capture of a vessel in the Gulf of Mexico, on the way to Texas.

One of the letters appears to have been written by our old friend Rhodes, formerly in the United States Patent Office, but now Commissioner of Patents in the C. S. A. Hear what he says to an inventor:—

RICHMOND, Va., June 22, 1861.

To A. Richards, Danville, Montgomery Co., Texas :

SIR :—A letter, dated S.C. Patent Office, with reference to the petitions, oaths and specifications in the matter of two applications of A. Richards, Danville, Montgomery Co., Texas, for Letters Patent for alleged improvements in breech-loading cannon, together with photographic representations of said improvements, informs the luckless inventor that his photographs are poor, and that the fee will be forty dollars in each case, and though the whole amount is not required to be paid upon the filing of the application, you are yet *recommended to pay it, to prevent delay in the issuance of your letters*, IF their issue should be ordered. Very respectfully,

RUFUS RHODES, Commissioner of Patents.

GRAND SOUTHERN EXPEDITION.—It is announced on good authority that a grand fleet accompanied by an army of 20,000 men will soon sail from this city for some point on the Southern coast. Troops are now being concentrated here for that purpose.

HIS Imperial Majesty, Alexander, the Emperor of Russia, has addressed a friendly note to his American Minister, Baron Stoeckl, desiring him to make known to the Federal government the deep interest he feels in the prosperity and existence of the Union, in which he justly sees the symbol and the pledge of our former prosperity and dignity as a nation. It is a grand letter,

RECENT AMERICAN INVENTIONS.

Water Wheels.—This invention, by Henry Van Dewater, of Weedsport, N. Y., relates to an improvement in that class of water wheels which are provided with draught tubes, for the purpose of attaining a two-fold action of the water, first gravity, and second suction. The invention consists in the employment or use of two water wheels, the buckets of which interlock or work into each other, and are arranged with a draught tube or gate, whereby it is believed that a good or large percentage of the power of the water is obtained by a very simple and economical arrangement of parts.

Dressing Frame.—This invention consists in the employment of a reed of peculiar construction ; also in regulating the speed of the dressing brush by the yarn itself, so that the disadvantages generally arising from a varying speed of the yarn in regard to the brush are avoided ; also in the employment of a fluted cylinder for the purpose of taking up the yarn, instead of a cylinder with a plain surface, whereby a baking or overheating of the yarn is avoided, if the dressing frame is stopped. Hugh Whitehill, of Newburgh, N. Y., is the patentee.

Low-Water Detector.—This improved low-water detector consists of a pipe entering the boiler at or near the top and opening thereinto at the lowest level to which it is intended for the water to sink and furnished outside with a cock, to whose plug is attached two opposite arms carrying balls, or their equivalents, one of which is hollow and always in communication with the boiler through the cock. When the water level is above the lower end of the pipe, the latter and the hollow arm and ball are kept filled with water by the pressure of steam, and are made to more than than balance the other arm and ball and to keep the cock closed against the escape of water ; but when the water level descends below the pipe, the water runs from the hollow arm and ball, and the other arm and ball, having the preponderance, open the cock to the atmosphere or to a whistle, and permit the escape of steam to give an alarm. This invention is by L. Youmans, of Fulton, N. Y.

Improvement in Steam Engines.—This invention, patented by J. Bradley, of St. Mary's, Ohio, relates to that class of steam engines known as "high and low-pressure" steam engines, in which the steam first acts upon a piston in a smaller cylinder, and afterward upon a second piston in a larger cylinder. It consists in an improved valve and system of ports for effecting the induction and eduction of steam to and from the two cylinders; also in certain means whereby, when it is desired to exert great power, the full pressure of steam can be made to act upon the larger piston.

Improvement in Melodeons.—This invention consists in the employment, in combination with any desirable number of the playing keys of a melodeon, or other reed instrument of similar character, of a system of hooks controlled by a pedal, for the purpose of keeping the keys depressed and prolonging the tones of the reeds for as long a time as desired after the removal of the fingers of the player from the keys. It also consists in operating the reed valve by means of levers, connected with the air chest by means of an air-tight fulcrum. It further consists in an improved device operated by a pedal, and combined with the receiving chamber of the bellows to reduce its capacity and have the effect of a soft swell on the tone of the reeds. This invention has been patented by W. H. Bigelow, of South Framingham, Mass.

THE Pittsville (Pa.) *Gazette* states that an oil well was lately sunk near that place, which spouted a volume of oil 70 feet in hight, and which for eight days past has been running at the rate of 800 barrels per day. It requires from eight to ten teams to carry off the barrels, and fifteen men to barrel it. The oil is very limpid, and the well is said to be "the biggest extant." It is 513 feet deep, and is sunk to the third sand stone series.

RECRUITING in Canada for the Union army is meeting with violent opposition from the local authorities. We do not wonder at it. Recruiting in the United States for the Crimean war came near leading us into serious trouble. We feel certain that the government has authorized no such movement, and will discountenance any attempts to recruit on Canadian soil.

Notes and Queries

A. J., of Vt.—The new lubricating substance to which you refer is described on page 376, Vol. IV, new series of the SCIENTIFIC AMERICAN. It is obtained from india rubber purified at a high temperature.

C. W. R., of Minn.—All metals, when heated with a charge of electricity, expand in proportion to their temperature.

A. W. B., of Ohio.—A patentee has the right to obtain, by re-issue, at any time during the life of his patent, claims for any devices shown in his original model. The foregoing, we believe, covers all of your inquiries.

H. W., of N. Y.—Sulphate of copper, 1 oz.; gum arabic, 2 oz.; copperas, 8 oz.; nut galls, in powder, 32 oz.; extract of logwood, 32, oz.; make a very good ink powder.

M. V., of Brooklyn, N. Y.—If you add a very minute quantity of sugar to the flour which is to be raised by the effervesce of bicarbonate of soda and muriatic acid, its taste will be improved. Bread which is raised by fermentation (especially when malt is used in making the yeast) has a more sweet and pleasant taste than that which is raised by effervesce. This is due to a small quantity of grape sugar developed during the fermenting process.

W. W. D., of Mass.—Our experience has led us to conclude that it is impossible to give general directions for extinguishing fires that will be suitable for all cases.

I. F. D., of N. Y.—The names of the engineering firms who are building the engines for the new gun-boats are published on page 39, present volume of the SCIENTIFIC AMERICAN.

D. B., of Vt.—Some magnets will lift their own weight, others will not. Their attractive power is inversely as the square of the distance. The "induction of magnets" is a very intricate question. The only exact method of ascertaining the power of a number of magnets is to test them with an electrometer. It is very seldom that we can find two magnets of the same size exhibiting equal power. The quality of the metal—flaws, scoria and temper—allinfluence the properties of a magnet.

S. D. W., of Iowa.—If the invention to which you refer has been in public use for more than two years previous to an application for a patent, then you can use it freely, and the patent, if granted, would be invalid.

W. H. K., of N. H.—There is an excellent account in Rees's Encyclopedia of the construction of church organs, showing the state of the art at the date of that publication. To obtain all the details of the manufacture, with the latest improvement, we know of no better plan than a visit to a manufactory.

S. G., of Ohio.—The idea that there is any rod which will detect mineral hid in the earth is simply a delusion founded in ignorance. There is no such rod.

L. M. S., of N. J.—You can get Dr. Weinland's pamphlet on tapeworms of L. M. Dornbach, 244 Canal street, this city.

F. W. B., of Mass.—You must apply to the Secretary of the Navy for information how to obtain the appointment of engineer in the navy. You cannot fit yourself for such a position by the study of books. You must off with your coat and go into the business practically. Thus only can your services be made available and useful.

A. H. S., of Mich.—We should give the preference to the American Encyclopedia over Chambers. Our reason for this is, that the former is more complete in all matters that relate to this country.

J. M. M., of Mass.—The California steamer to which you refer as getting in her engines, in this city, is the *Constitution*. You will find a description of this vessel on page 106, this volume, of the SCIENTIFIC AMERICAN, where you will also obtain information respecting parties with whom you can communicate about the business to which you refer.

A. W. L., of Me.—We have seen plate glass manufactured. The materials of which it is made consist of sand (silica) and a reducing flux, composed of an alkali, generally crude carbonate or soda and a little lime. These are placed in a "melting pot" of fire clay, and subjected to a most intense heat in a furnace. When it is melted, a sufficient quantity to make a plate of glass of a certain size is first poured upon a large smooth iron table, then a huge roller of polished iron is moved over it, which rolls it out as a baker would roll a flat cake of dough. The iron table has a raised edge on each side, on which the roller moves; this edge gages the thickness of the plate. When the plate is rolled out it is pushed off the table upon a large receiving flat-iron pan and placed in an anealing oven, where it remains several days. It is introduced at a high heat and cooled very slowly. Some plates are used rough for skylights, vault covers, &c., but for looking-glasses they require to be polished. When the pots of melted glass are poured upon the iron table, and the huge iron roller is moved over the fiery fluid mass, bright flashes of light dart from floor to roof of the glass manufactory. We have seen plates made nine feet in length by five in breadth. It is almost needless to say that from a mere description no one can make plate glass. Practical knowledge is necessary.

M. K., of Ill.—An arrangement of reflectors and lenses which would send a focus of light and heat two or three miles, without diminishing its intensity, so that it would set objects on fire with the same facility as an ordinary sun glass, would be novel. We suppose of course you mean to bring the rays to a focus first and then send them off.

S. N. C., of Conn.—The petroleum or coal oils are all hydrocarbons, and will consequently entirely burn up without leaving any ashes or soot; the products of combustion being wholly water and carbonic acid. Of course, a sufficient supply of air must be furnished, and the heat and temperature must be high enough for combustion.

Money Received

At the Scientific American Office on account of Patent Office business, during one week preceding Wednesday, Sept. 11, 1861:—

E. F., of Cal., $15; J. L. R., of Wis., $15; E. C., of Ohio, $15; J. M. P., of Ohio, $15; F. & L., of N. Y., $15; C. Van N., of N. Y., $15; S. G. M., of Pa., $15; M. J. K., of N. Y., $15; B. S. C., of N. Y., $15; B. G. H., of Pa., $15; J. B., of Ill., $15; M. A. F., of N. Y., $15; J. R. G., of Ky., $80; Mrs. J. R., of Pa., $20; J. F. D., of N. Y., $43; D. McK., of N. Y., $20; M. & C., of Pa., $20; J. H. S., of N. Y., $20; C. L. G., of N. Y., $25; J. R., of N. Y., $25; C. W. and others, of ——, $15; M. G., of Pa., $15; L. F., of Ohio, $15; P. B., of R. I., $15; J. A. U., of Iowa, $15; L. M. D., of N. H., $15; A. F. W., of Pa., $25; C. E. S., of Md., $15; M. F., of N. Y., $10; S. S., of Mass., $25; P. & L., of Mich., $25; J. W. L., of N. J., $15; E. K., Jr., of N. Y., $15; W. D., of R. I., $45; G. D. W., of Mich., $10; H. Q. H., of N. Y., $20; F. & W., of Iowa, $20; W. M., of N. Y., $25; L. T., of N. Y., $25; C. L. N., of N. Y., $25; E. W., of N. J., $15; E. B., of Mass., $15; W. W. F., of Iowa, $15; R. R. G., of Ill., $20; J. W. S., of N. Y., $25; J. & T., of Wis., $28; F. H. B., of N. Y., $15; M. & N., of Mich., $25; J. A. G., of Conn., $22; C. F. F., of N. Y., $10; T. H. G., of Wis., $50; A. H. B., of N. Y., $45; S. R., of N. Y., $20; J. M., of Iowa, $20; A. A. L., of Iowa, $20; W. J. P., of N. Y., $25; H. S. C., of N. Y., $25; V. & N., of N. Y., $25; S. & R., of N. Y., $50; E. F., of N. Y., $10.

Specifications and drawings and models belonging to parties with the following initials have been forwarded to the Patent Office from Sept. 4 to Wednesday, Sept. 11, 1861:—

D. & G., of Ill.; C. L. G., of N. Y.; H. S. C., of N. Y.; S. S., of Mass.; M. & N., of Mich.; J. F. D., of N. Y.; H. C., of England; W. M. of N. Y.; B. F. S., of Wis.; P. & L., of Mich.; C. L. N., of N. Y.; J. & T., of Wis.; E. F., of N. Y.; J. E., of Conn.; W. J. P., of N. Y.; J. H. S., of N. Y.; L. T., of Y. Y.; J. R., of N. Y.; A. F. W., of Pa.; V. & N., of N. Y.; S. G. M., of Pa.; S. & R., of N. Y., two cases.

INSTRUCTIONS ABOUT EUROPEAN PATENTS, With a Synopsis of the Patent Laws of the Various Countries.

AMERICAN INVENTORS SHOULD BEAR IN MIND that, as a general rule, any invention which is valuable to the patentee in this ountry is worth equally as much in England and some other foreign countries. Four patents—American, English, French and Belgian—will secure an inventor exclusive monopoly to his discovery among 100,000,000 of the most intelligent people in the world. The facilities of business and steam communication are such that patents can be obtained abroad by our citizens almost as easily as at home. The majority of all patents taken out by Americans in foreign countries are obtained through the Scientific American Patent Agency. We have established agencies at all the principal European seats of government, and obtain patents in Great Britain, France, Belgium, Prussia, Austria, Spain, &c., with promptness and dispatch.

It is generally much better to apply for foreign patents simultaneously with the application here; or, if this cannot be conveniently done, as little time as possible should be lost after the patent is issued, as the laws in some foreign countries allow patents to any one who first makes the application, and in this way many inventors are deprived of valid patents for their own inventions.

Many valuable inventions are yearly introduced into Europe from the United State, by parties ever on the alert to pick up whatever they can lay their hands upon which may seem useful.

Models are not required in any European country, but the utmost care and experience is necessary in the preparation of each case.

GREAT BRITAIN.

Patents for inventions under the new law, as amended by the act of Oct. 1, 1852, and now in operation, include the United Kingdom of Great Britain and Ireland in one grant, which confers the exclusive right to make, use, exercise or vend. This is conceded to the inventor, or the introducer, for a period of fourteen years, subject, after the patent is granted, and the first expenses paid, to a government tax twice during its existence—once within three years, and once again within seven. The purchaser of a patent would assume the payment of these taxes.

There is no provision in the English law requiring that a patented invention shall be introduced into public use within any specified limit. Under the Patent Act of October, 1852, the British government relinquished its right to grant patents for any of its colonies, each colony being permitted to regulate its own patent system. If a patent has been previously taken out in a foreign country, the British patent will expire with it.

FRANCE.

Patents in France are granted for a term of fifteen years, unless the invention has been previously secured by patent in some other country; in such case, it must take date with and expire with the previous patent. After the patent s issued, the French government requires the payment of a small tax each year so long as the patent is kept alive, and two years' time is given to put the invention patented into practice.

It should be borne in mind that, although the French law does not require that the applicant should make oath to his papers, yet if a patent should be obtained by any other person than the inventor, upon proof being adduced to this effect before the proper tribunal, the patent would be declared illegal.

BELGIUM.

Patents in Belgium are granted for twenty years, or if previously patented in another country, they expire with the date thereof. The working of the invention must take place within one year from date of patent; but an extension for an additional year may be obtained on application to the proper authorities. Inventors are only legally entitled to take out patents.

THE NETHERLANDS.

Patents are granted by the Royal Institute of the Netherlands to natives or foreigners represented by a resident subject, which extend to a period of about two years, within which time the invention must be brought into use, and upon payment of an additional tax, a patent will be granted to complete its whole term of fifteen years. Unless these conditions are complied with, the patent ceases.

PRUSSIA.

Applications for patents in Prussia are examined by the Royal Polytechnic Commission, and unless there is novelty in the invention, the applicant's petition will be denied; and if it is granted, the invention must be worked within six months afterward. A respite, however, of six additional months may be obtained, if good and sufficient reasons for it can be shown.

AUSTRIA

Austrian patents are granted for a term of fifteen years, upon the payment of 1,000 florins, or about $500 in American currency. This sum, however, is not all required to be paid in advance. It is usual to pay the tax for the first five years upon the deposit of the papers, and the patent must be worked within its first year. The Emperor can extend the patent and privilege of working by special grant. In order to obtain a patent in Austria, an authenticated copy of the original Letters Patent must be produced.

SPAIN.

The duration of a Spanish patent of importation is five years, and can be prolonged to ten years; and the invention is to be worked within one year and one day.

To obtain a Cuban patent requires a special application and an extra charge.

RUSSIA.

Since the close of the Crimean war, considerable attention has been given to Russian patents by Americans. Russia is a country rich in mineral and agricultural products, and there seems to be a field open for certain kinds of improvements. The present Emperor is very liberally disposed toward inventors, and as an evidence of the interest which he takes in the progress of mechanic arts, we may state that we have had visits from two distinguished Russian *savans*, speciallŝ sent out by the Emperor to examine Amdrican inventions. As Russian patents are expensive, and somewhat difficult to obtain, we do not take it upon ourselves to advise applications; inventors must judge for themselves; and this remark applies not only to Russia, but also to all other foreign countries.

CANADA.

Patents of invention are granted only to actual residents of Canada and British subjects. Under the general Patent Law of Canada, an American cannot procure a patent for his invention there. The only way in which he can do so is by virtue of a special act of Parliament, which is very difficult, uncertain, and expensive to obtain. Several zealous friends of reform in Canada are working earnestly to bring about a reciprocal law, but their efforts have thus far proved fruitless.

BRITISH INDIA.

The date of the law, Feb. 28, 856; duration of a patent, fourteen years. Invention must be worked within two years from date of petition. Privilege granted only to the original inventor or his authorized agent in India.

SAXONY.

Duration of patent, from five to ten years. Invention must be worked within one year from date of grant. Careful examination made before granting a patent.

HANOVER.

Duration of patent, ten years; and in case of foreign patent having been previously obtained, an authenticated copy of said patent must be produced. Invention must be worked within six months from date of grant.

SARDINIA.

Duration of patent, from one to fifteen years. Patents for five years or less must be worked within one year, and all others within two years.

NORWAY AND SWEDEN.

Duration of patent, three years, at least; fifteen at most, according to the nature and importance of the invention. Patents for foreign inventions not to exceed the term granted abroad, and to be worked within one, two or four years.

AUSTRALIA.

Date of law, March 31, 1854. Careful examination made by competent persons previous to issue of patent, which, when granted, extends to fourteen years. Imported inventions are valid according to duration of foreign patent. It would require from twelve to eighteen months to procure a patent from the Australian government.

Parties holding foreign patents secured through our agency will be notified from time to time of the condition of their cases.

GENERAL REMARKS.

While it is true of most of the European countries herein specified, that the system of examination is not so rigid as that practised in this country, yet it is vastly important that inventors should have their papers prepared only by the most competent solicitors, in order that they may stand the test of a searching legal examination; as it is a common practice when a patentee finds a purchaser for his invention for the latter to cause such examination to be made before he will accept the title.

It is also very unsafe to entrust a useful invention to any other than a solicitor of known integrity and ability. Inventors should beware of speculators, whether in the guise of patent agents or patent brokers, as they cannot ordinarily be trusted with valuable inventions.

Messrs. MUNN & CO. have been established *fifteen years* as American and Foreign Patent Attorneys and publishers of the SCIENTIFIC AMERICAN, and during this time they have been entrusted with some of the most important inventions of the age; and it is a matter of pardonable pride in them to state that not a single case can be adduced in which they have ever betrayed the important trust committed to their care. Their agents in London, Paris, and other Continental cities, are among the oldest and most reliable Patent Solicitors in Europe, and they will have no connection with any other.

CAUTION.—It has become a somewhat common practice for agents located in England to send out circulars soliciting the patronage of American inventors. We caution the latter against heeding such applications, or they may otherwise fall into the hands of irresponsible parties, and thus be defrauded of their rights. It is much safer for inventors to entrust their cases to the care of a competent, reliable agent at home.

FEES.—The fees required by us for the preparation of foreign applications are not the same in every case; as, in some instances, when the inventions are of a complicated character, we are obliged to charge a higher fee. Applicants can always depend, however, upon our best terms, and can learn all particulars upon application, either in person or by letter.

Parties desiring to procure patents in Europe can correspond with the undersigned, and obtain all the necessary advice and information respecting the expenses of obtaining foreign patents.

All letters should be addressed o Messrs. MUNN & CO., No. 37 Park-row, New York.

CHANGE IN THE PATENT LAWS.

NEW ARRANGEMENTS—PATENTS GRANTED FOR SEVENTEEN YEARS.

The new Patent Laws, recently enacted by Congress, ar now in full force, and promise to be of great benefit to all parties who are concerned in new inventions.

The duration of patents granted under the new act is prolonged to SEVENTEEN years, and the government fee required on filing an application for a patent is reduced from **$30** down to **$15**. Other changes the fees are also made as follows:—

On filing each Caveat	$10
On filing each application for a Patent, except for a design	$15
On issuing each original Patent	$20
On appeal to Commissioner of Patents	$20
On application for Re-issue	$30
On application for Extension of Patent	$50
On granting the Extension	$50
On filing Disclaimer	$10
On filing application for Design, three and a half years	$10
On filing application for Design, seven years	$15
On filing application for Design, fourteen years	$30

The law abolishes discrimination in fees required of foreigners, except in reference to such countries as discriminate against citizens of the United States—thus allowing English, French, Belgian, Austrian, Russian, Spanish, and all other foreigners except the Canadians, to enjoy all the privileges of our patent system (except in cases of designs on the above terms.

During the last sixteen years, the business of procuring Patents for

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new inventions in the United States and all foreign countries has been conducted by Messrs. MUNN & CO., in connection with the publication of the SCIENTIFIC AMERICAN; and as an evidence of the confidence reposed in our Agency by the Inventors throughout the country, we would state that we have acted as agents for more than FIFTEEN THOUSAND Inventors! In fact, the publishers of this paper have become identified with the whole brotherhood of Inventorr and Patentees, at home and abroad. Thousands of Inventors o whom we have taken out Patents have addressed to us most flattering estimonials for the services we have rendered them, and the wealth which has inured to the Inventors whose Patents were secured through this Office, and afterward illustrated in the SCIENTIFIC AMERICAN, would amount to many millions of dollars! We would state that we never had a more efficient co ps of Draughtsmen and Specification Writers than are employed at p esent in our extensive Offices, and we are prepared to attend to Patent business of all kinds in the quickest time and on the most liberal terms.

Rejected Applications.

We are prepared to undertake the investigation and prosecution of rejected cases, on reasonable terms. The close proximity of our Washington Agency to the Patent Office affords us rare opportunities for the examination and comparison of references, models, drawings, documents, &c. Our success in the prosecution of rejected cases has been very great. The principal portion of our charge is generally left dependent upon the final result.

All persons having rejected cases which they desire to have prosecuted are invited to correspond with us on the subject, giving a brief history of their case, inclosing the official letters, &c.

Testimonials.

The annexed letters, from the last three Commissioner of Patents, we commend to the perusal of all persons interested in obtaining Patents:—

Messrs. MUNN & Co.:—I take pleasure in stating that, while I held the office of Commissioner of Patents, MORE THAN ONE-FOURTH OF ALL THE BUSINESS OF THE OFFICE CAME THROUGH YOUR HANDS. I have no doubt that the public confidence thus indicated has been fully deserved, as I have always observed, in all your intercourse with the Office, a marked degree of promptness, skill and fidelity to the interests of your employers. Yours, very truly,

CHAS. MASON.

Immediately after the appointment of Mr. Holt to the office of Postmaster-General of the United States, he addressed to us the subjoined very gratifying testimonial:—

Messrs. MUNN & Co.:—It affords me much pleasure to bear testimony to the able and efficient manner in which you have discharged your duties of Solicitors of Patents while I had the honor of holding the office of Commissioner. Your business was very large, and you sustained (and, I doubt not, justly deserved) the reputation of energy, marked ability and uncompromising fidelity in performing your professional engagements. Very respectfully,

Your obedient servant, J. HOLT.

MESSRS. MUNN & Co.:—Gentleman: It gives me much pleasure to say that, during the time of my holding the office of Commissioner of Patents, a very large proportion of the business of inventors before the Patent Office was transacted through your agency, and that I have ever found you faithful and devoted to the interests of your clients, as well as eminently qualified to perform the duties of Patent Attorneys with skill and accuracy. Very respectfully,

Your obedient servant, WM. D. BISHOP.

The Validity of Patents.

Persons who are about purchasing Patent property, or Patentees who are about erecting extensive works for manufacturing under their Patents, should have their claims examined carefully by competent attorneys, to see if they are not likely to infringe some existing Patent, before making large investments. Written opinions on the validity of Patents, after careful examination into the facts, can be had for a reasonable remuneration. The price for such services is always settled upon in advance, after knowing the nature of the invention and being informed of the points on which an opinion is solicited For urther particulars, address MUNN & CO., No. 37 Park-row, New York.

The Examination of Inventions.

Persons having conceived an idea which they think may be patentable, are advised to make a sketch or model of their invention, and submitit to us, with a full description, for advice. The points of novelty re carefully examined, and a reply written corresponding with the acts, free of charge. Address MUNN & CO., No. 37 Park-row, New York.

Preliminary Examinations at the Patent Office.

The advice we render gratuitously upon examining an invention does not extend to a search at the Patent Office, to see if a like invention has been presented there, but is an opinion based upon what knowledge we may acquire of a similar invention from the records in our Home Office. But for a fee of $5, accompanied with a model or drawing and description, we have a special search made at the United States Patent Office, and a report setting forth the prospects of obtaining a Patent &c., made up and mailed to the Inventor, with a pamphlet, giving instructions for further proceedings. These preliminary examinations are made through our Branch Office, corner of F and Seventh-streets, Washington, by experienced and competent persons. Over 1,500 of these examinations were made last year through this Office, and as a measure of prudence and economy, we usually advise Inventors to have a preliminary examination made. Address MUNN & CO., No. 37 Park-row, New York.

Caveats.

Persons desiring to file a Caveat can have the papers prepared in the shortest time by sending a sketch and description of the invention. The government fee for a Caveat, under the new law, is $10. A pamphlet of advice regarding applications for Patents and Caveats furnished gratis on application by mail. Address MUNN & CO., No. 37 Park-row New York.

Foreign Patents.

We are very extensively engaged in the preparation and securing of Patents in the various European countries. For the transaction of this business, we have offices at Nos. 66 Chancery-lane, London; 29 Boulevard St. Martin, Paris; and 26 Rue des Eperonniers, Brussels. We think we can safely say that THREE-FOURTHS of all the European Patents secured to American citizens are procured through our Agency.

Inventors will do well to bear in mind that the English law does not limit the issue of Patents to Inventors. Any one can take out a Patent there.

Circulars of information concerning the proper course to be pursued in obtaining Patents in foreign countries through our Agency, the requirements of different Patent Offices, &c., may be had gratis upon application at our principal office, No. 37 Park-row, New York, or either of our Branch Offices.

Assignments of Patents.

The assignment of Patents, and agreements between Patentees and manufacturers, carefully prepared and placed upon the records at the Patent Office. Address MUNN & CO., at the Scientific American Patent Agency, No. 37 Park-row, New York.

Interferences.

We offer our services to examine witnesses in cases of interference, o prepare arguments, and appear before the Commissioner of Patents or in the United States Court, as counsel in conducting interferences or appeals.

For further information, send for a copy of "*Hints to Inventors.*" Furnished free. Address MUNN & CO., No. 37 Park-row, New York.

How to Make an Application for a Patent.

Every applicant for a Patent must furnish a model of his invention, if susceptible of one; or if the invention is a chemical production, he must furnish samples of the ingredients of which his composition is composed, for the Patent Office. These should be securely packed, the Inventor's name marked on them, and sent, with the government fee, y express. The express charge should be prepaid. Small models from a distance can often be sent cheaper by mail. The safest way to remit money is by draft on New York, payable to the order of Munn & Co. Persons who live in remote parts of the country can usually purchase drafts from their merchants on their New York correspondents; but if not convenient to do so, there is but ttle risk in sending bank bills by mail, having the letter registered by the postmaster. Address MUNN & Co., No. 37 Park-row, New York.

Extension of Patents.

Va uable Patents are annually expiring which might be extended and bring fortunes to the households of many a poor Inventor or his family. We have had much experience in procuring the extension of Patents; and, as an evidence of our success in this department, we would state that, in all our immense practice, we have lost but *two* cases, and these were unsuccessful from causes entirely beyond our control.

It is important that extension cases should be managed by attorneys of the utmost skill to insure success. All documents connected with extensions require to be carefully drawn up, as any discrepancy or untruth exhibited in the papers is very liable to defeat the application.

Of all business connected with Patents, it is most important that extensions should be intrusted only to those who have had long experience, and understand the kind of evidence to be furnished the Patent Office, and the manner of presenting it. The heirs of a deceased Patentee may apply for an extension. Parties should arrange for an application for an extension at least six months before the expiration of the Patent.

For further information as to terms and mode of procedure in obtaining an extension, address MUNN & CO., No. 37 Park-row, New York.

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THE NEW GUNBOATS.

The accompanying illustration is a vertical longitudinal section—showing the whole interior—of one of the new steam gunboats built in this city. All the apartments are clearly represented, and an accurate idea is thus conveyed of the locality and purpose of each. The bill authorizing the construction of these boats—twenty-three in number—was passed last spring, and early in June—as noticed on page 350 last volume of the SCIENTIFIC AMERICAN—the Navy Department had invited proposals for building them. The hulls and machinery were designed by the chiefs of the Naval Construction and Engineering Department of the navy, and the specifications were all prepared at the Navy Bureau for the contractors. To obtain an efficient navy, the vessels must be constructed with special adaptations for the duties they are intended to perform. This was the ruling idea which governed those in authority to plan and propose the building of these vessels. A very large number of proposals was received for constructing them, and considerable delay was experienced before the contracts were made, but at last they were given out and distributed among twenty-three builders—one to each—scattered from Maine to Maryland, as follows:—John J. Abraham, Baltimore, Md.; M. Thatcher, Wilmington, Del.; John Lynn, Jacob Birley, and Hilman & Stracker, Philadelphia, Pa.; Jacob Westervelt, John Englis, T. Stack, J. Simonson, E. & H. Pouillon and Webb & Bell, New York; E. & W. Goodspeed, East Haddam, Mass.; Marsen, Fish & Co., Gildersleve & Sons, Mystic, Conn.; P. Curtis, A. & G. Simpson and Curtis & Tilden, Boston; G. W. Jackson, Jr, Newburyport, Mass. G. W. Lawrence, Thomaston, Me.; C. P. Carter, Belfast; J. W. Dyer, Portland; Larabee & Allen, Bath, and N. N. Thompson, Kennebunck, Maine. Of the entire number, six were given to shipbuilders in New York and its vicinity. The above engraving was taken by our artist from one of these—the *Ottawa*, built by Westervelt—now lying at the dock of the Novelty Works, receiving her machinery. They are all alike in model and dimensions, so that a view of one conveys a correct idea of them all. Each is 168 feet on deck; 158 feet on the load line; 28 feet extreme of beam; depth 12 feet; capacity 500 tuns. It is rigged as a fore and aft schooner, but steam is the power to be mostly depended upon. The name by which they are called, "steam gun-boats," is a misnomer; steam war schooners being the more appropriate. The model is beautiful, but the builders really did not know the shape until it was put up, as the vessel was molded entirely from patterns—the working drawings and specifications having been furnished from the Navy Department at Washington.

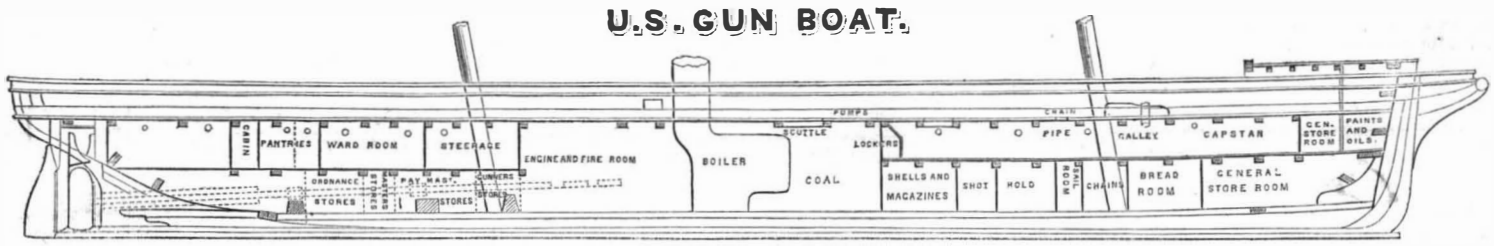
The forward orlop or under deck, is for crew and store rooms; the hold for magazine, &c. The after orlop deck is divided into cabin, officers' rooms, wardroom, &c. The engines and machinery are below the waterline amidship of the vessel.

The main or gun deck is to be equipped with twelve 32-pounders—six on each side—and one large pivot gun. A rifled cannon will also be placed on the forecastle deck. The armament for each is quite powerful, and the twenty-three vessels will be quite an effective fleet in themselves, carrying no less than 322 guns.

When one of the boats is rigged and equipped we shall present our readers with a perspective view, showing the vessel as it will appear when afloat.

Four of these gun-boats have been launched, as follows;—The *Unadilla*, Aug. 17th, by J. Englis; the *Ottawa*, by Westervelt, 22d; the *Seneca*, by J. Simonson, 27th; the *Pembina*, by T. Stack, 28th. The machinery for these four vessels has been built at the Novelty Works. The engines of the *Unadilla* are fitted up, and the vessel has been moved back to Mr. Englis's dock for finishing off the carpenter work. The engines of the *Ottawa* are very nearly fitted up also; and those of the other two gunboats are progressing rapidly. We were on board these vessels two days ago. Some naval officers have already been appointed to the first two, which will soon be sent to the Navy Yard to get in their armaments, &c. The contracts for the building of these four gunboats were signed on the 27th of June, and by the terms they were to be completed in 90 days. They will all be finished within that period, and we have no doubt but they will prove very efficient war craft—a credit to their designers, the builders of the hulls and machinery. The two gun-boats contracted for by Messrs. Pouillon and by Webb & Bell are not yet launched; their contracts were for a longer period than the others.

Seven gunboats for the western rivers have also been commenced, four at Carondolet, near St. Louis, and three at Mound City, on the Ohio, near Cairo. The designs are furnished by Mr. Pook, naval constructor; the boats will be ball proof. They are intended to be ready for delivery at Cairo on the 5th of October. The dimensions will be as follows:—Length, 175 feet; breadth of beam, 51½ feet; depth of hold, 6 feet. Each boat will mount 16 heavy guns, carry a suitable number of men to work them, and draw not more than six feet of water. The hull, all the upper portion of the boat enclosing the machinery, will be plated with iron 2½ inches in thickness. The cost of each will be $89,000.



A Gigantic Soap Kettle---How to Make Saleratus.

The largest kettle in the world, we believe, is employed in the extensive soap and saleratus manufactory of Mr. B. T. Babbitt, Nos. 64 to 74, inclusive, in Washington street, this city. This kettle is 15 feet deep by 63 feet in circumference, and is capable of making 250 tuns of the best quality of curd soap at one batch. The cost for the grease alone in one charge is no less than $20,000, and it takes about six days' time to complete a large batch of curd soap in this kettle. Steam is employed for heating it, and 3,000 feet of one-inch pipe, coiled on the bottom, are required for this purpose. With common kettles the soap is lifted out with dippers and poured into frames, but it would be an almost endless task thus to empty a kettle of such huge dimensions. It is therefore drawn off in a convenient manner from the bottom through a revolving cock; and a jet of high pressure steam is conducted to this outlet to "clear the way," should the soap become thick and clog the opening. Common soap kettles are made of cast iron; this one is constructed of boiler plate. Mr. Babbitt, with his facilities for cooking, could furnish a quarter of a million of soldiers with two pounds each of good bean soup in one installment. Standing at the top and looking down into this huge kettle, it presents a somewhat appalling appearance, the *swells* of boiling soap rise and fall in it like young volcanic eruptions, or the contortions of victims in a giant's caldron.

Large quantities of saleratus are also manufactured by Mr. Babbitt. This material is made from common soda ground to powder and excessively charged with carbonic acid gas, which is obtained as the product of perfect combustion from furnaces. The ground soda is placed in shallow wooden boxes—two inches deep and six feet square—and kept in a close room, exposed to the action of the gas until fully charged. Six rooms are used for making saleratus, and 600 boxes are charged in each. In busy seasons 15 tuns of saleratus are manufactured at this establishment alone per day. Sal soda and a number of other articles, such as yeast powders, soap powder, super carbonate of soda, &c., &c., are manufactured by Mr. Babbitt on a correspondingly extensive scale. Two steam boilers of 60-horse power each, one of Corliss & Nightingale's engines of 125-horse power, also two of Otis's steam elevators, engravings of which have appeared in our columns, are employed to supply the power and drive the machinery.

Mr. Babbitt, the proprietor of these extensive works, is also considerable of an inventor as well as manufacturer. His name often appears under the head of patents published from week to week in these columns. His last two inventions being for improvements in cannon and iron war vessels.

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FROM THE STEAM PRESS OF JOHN A. GRAY

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